AMSTRAD CPC-464

Learning Programs

TONY NOBLE

Fifty fun packed games, specially designed to help you learn!

SIGMA PRESS

Amstrad CPC-464 Learning Programs

Tony Noble

Σ
SIGMA
PRESS

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Reader Convenience Cassette

The programs in this book are listed directly from a CPC-464 and are, therefore, technically accurate.

If, however, you wish to obtain a cassette containing all of the programs in the book, just send £6.95 direct to:

Sigma Press
5 Alton Road
Wilmslow
SK9 5DY

This cassette is only available direct from Sigma. The price includes VAT and postage in the United Kingdom and Europe.

INTRODUCTION - FOR PARENTS AND TEACHERS

Computers are here and their uses in the home are many. We all have our favourite arcade-type games which we sit and play at for hours, and children and adults seem equally fascinated by them, but home computers can also be used as a powerful aid to learning.

Because children learn so easily through 'play', the computer, when loaded with fun learning programs, helps children learn without them realising it.

The fifty programs in this book (but including the choices within many programs, the total is in excess of 85!!), are designed to increase your computer fun and learning. Nearly all the programs have colourful graphics and music. Try adding numbers with "Jig the Juggler", landing your spacecraft on the moon in "Aliens", or even try your hand at "Donkey racing at the Strad Stadium".

The programs cover a very wide educational spectrum and include:

- geography
- history
- mathematics
- language development
- logic skills
- memory retention skills
- general knowledge
- science, including the collecting of Data

keyboard training

adventure simulation games

graphs

French.

The many programs in this book are so diverse as to include games and learning programs for all ages from 4 to 16, but all the family will benefit from the simple "Programming Hints", by studying the listings for programming ideas, and from the "Typing Tips" which will help you avoid the common pitfalls when copying programs. Wherever your interests lie, there will be something here for you.

All the programs in the book have been tested so be patient when entering your listings into the computer's memory. Check each line of type as it is completed- this is a habit I have developed and it can certainly save time and frustration later.

A ruler placed along a line helps read that line of print. I have typed out many programs from magazines and although occasionally there are listing errors, it has usually been an error on my part.

Avoid the common errors—

missing out lines,

not completing lines,

mis-typing variables such as B instead of B$,

confusion between 1 (one) and l (small letter L),

confusion between nought (0) and the letter O,

spelling errors,

always make sure that you have the correct spaces in a listing, the reason for their presence may not be obvious but to alter any will undoubtedley cause problems,

beware of full stops, commas, semi-colons etc.

So, check your typing to avoid time-consuming errors.

Some of the programs include a "TYPING TIP" before the listing, which highlight possible areas of confusion. Always read this TIP before typing in the program.

UPPER and Lower Case Letters : The listings in this book all appear in UPPER CASE letters, but when typed and entered onto the keyboard appear in lower case. When LISTed the program will appear in UPPER case. It is advisable that the program is entered using the lower case as you will be able to spot typing errors more easily, since the mistyped letter will appear in lower case when listed. Do not confuse your typing errors with the variables in the program as all these appear in lower case also.

With each program or group of programs is ■ PROGRAMMING HINT- helpful advice which refers to the program it is with and which will help all budding programmers to make a start.

These HINTS do not cover extensively all aspects of programming but simplify some of the more common commands and functions in BASIC. You will then be able to use them in your own programs or when adapting others.

INTRODUCTION - FOR OLDER CHILDREN AND STUDENTS.

Hello! Welcome to your Amstrad Learning Programs. I hope that you will enjoy using these programs and I know that they will help you to learn all sorts of things from English Grammar and the Periodic Table of Chemical Elements, to remembering where places are on a map.

When you have typed in the program listings- perhaps with a little help, READ THE INSTRUCTIONS IN THE BOOK CAREFULLY before running the programs because there are not always instructions on the screen. You must obey the instructions at all times. You will need to use the ENTER key a lot. Find this key. It is on the right-hand side of the keyboard. Check the program instructions to see just when to use it. With all the program instructions, (except for Smugglers), you will see a screen picture showing part of the program.

This will help you understand the program.

GOOD LUCK! HAPPY LEARNING!

INTRODUCTION - FOR YOUNG CHILDREN.

I hope that you have some fun using your computer. At first, a grown-up will have to help you and tell you what to do, but soon you will be able to run the programs on your own. You will always be able to type in your own answers.

HAVE FUN!

WHICH PROGRAMS ARE BEST FOR YOUR CHILD?

A suggested age range has been included with each program BUT it must be remembered that this is only a GUIDE - all children are unique, and as such, their learning abilities will differ considerably.

There are 50 programs in this book BUT many of the programs include a choice of difficulty and will therefore cover a wide age range. Do choose the programs most suited for your child.

As your child progresses through his schooling there will be programs in this book for him, whether he is just starting Nursery School or preparing for 'O' Levels. This is a book to grow with your child through their school life!

KEYBOARD (age 5 - 12 years)

ALPHABETICAL ORDER (age 4 - 7 years)

MONEY (age 6 - 10 years) - three program listings

- JIG THE JUGGLER
- CHANGE
- POUNDS AND PENCE

TEN GREEN BOTTLES (age 8 - 13 years)

CRACK-THE-CODE (age 7 - 11 years)

ALIENS (age 5 - 12 years)

V-A-N (age 8 - 13 years)

JAIL (age 6 - 12 years)

FLASH (age 7 - 12 years)

SNAP (age 6 - 12 years)

MULTIPLICATION (age 6 - 14 years)

MORE OR LESS (age 6 - 12 years)

INVASION OF THE OCTOPOIDS (age 8 - 12 years)

COUNT (age 3 - 6 years)

DATES (age 9 - 15 years)

VISUAL ADDITION AND SUBTRACTION (age 3 - 7 years) - two program listings

VIS-SUB

VIS-ADD

DONKEY RACING (age 9 - 13 years)

SMUGGLERS (age 9 - 14 years)

MOON-BUGGY (age 5 - 13 years)

SEARCH (age 6 - 10 years)

MATCH (age 3 - 7 years)

PARLEZ-VOUS-FRANCAIS (age 10 - 15 years) - three program listings

BONJOUR

LA MAISON

FRENCH

DIVISION (age 7 - 14 years)

PHRASES (age 9 - 15 years)

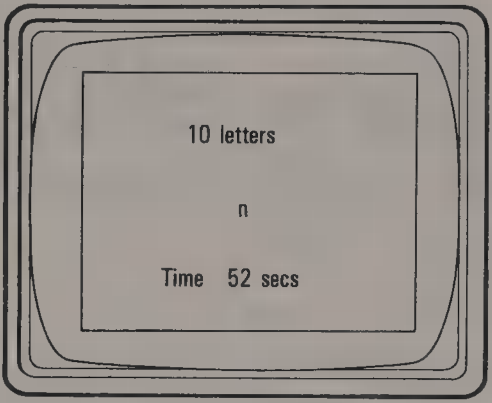
SAM CAT (age 5 - 9 years)

- MISS HOMONYM (age 9 - 14 years)
- LAUNCH-A-ROCKET (age 6 - 12 years)
- PERIODIC TABLE (age 13 - 16 years)
- CROCGRAMS (age 7 - 15 years) - three program listings
  - CROCGRAMSONE (age 7 - 11 years)
  - CROCGRAMSTWO (age 9 - 13 years)
  - CROCGRAMSTHREE (age 10 - 15 years)
- STAIRWAY TO SUCCESS (age 8 to 14 years)
- SEA-BATTLE (age 8 - 14 years)
- GEOGRAPHY (age 9 - 16 years) - five program listings
  - BRITAIN-PHYSICAL
  - BRITAIN-TOWNS
  - CAPITALS
  - E.E.C. QUIZ
  - WORLD FACTS
- PYTHAGORAS (age 12 - 16 years)
- NAME THAT BIRD (age 9 - 16 years) - two program listings
  - GARDEN-BIRDS
  - BIRDFACTS
- GRAPHS (age 9 - 16 years) - three program listings
  - BIRTHGRAPHS
  - RAINFALL
  - TEMPERATURE
- WORD-FIND (age 9 - 13 years)

KEYBOARD

PARENTS- here is a program to practice keyboard familiarity. Two minutes are allowed to see how many letters can be copied correctly from the screen.

CHILDREN- how fast can you type? This program puts a letter on the screen and you have to find that letter on the keyboard. Hit the key when you find the correct one. The number of correct letters that you have hit and the time you have taken is shown like this:-



```
10 letters

n

Time   52 secs
```

Try to beat your friend's total!

PROGRAMMING HINTS - `PRINT` and LINE NUMBERS

The `PRINT` statement is used to program text into the computer.

Try this simple program:-

```
10 PRINT "Hello"

20 PRINT "I'm your Amstrad Computer"

RUN
```

This is a simple program, showing that when words are required to be printed on the screen, they must be put in the `PRINT` command using inverted commas. These commands must also be given a line number. These line numbers usually go up in tens so that it is easy to insert another line. For instance, in the program above, a time loop could be inserted at line 15 without having to rewrite the program.

Try it! Type:-

```
15 FOR t = 1 TO 500 : NEXT t
```

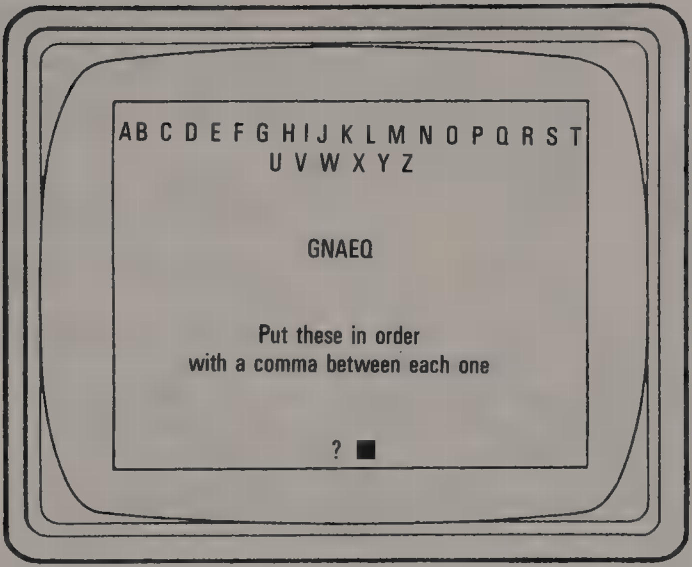
The program automatically sorts the lines into order.

```
1 REM keyboard
10 MODE 0
50 WINDOW #1,1,20,1,25
60 WINDOW #2,6,15,7,14
62 PEN 1 : INK 1,0 : PEN 2 : INK 2,3
63 PEN #1,2 : LOCATE #1,1,5 : PRINT #1,"KEYBOARD F
AMILIARITY" : LOCATE #1,2,9 : PRINT #1,"How many l
etters" : PRINT #1 : LOCATE #1,2,11 : PRINT #1,"ca
n you get correct" : PRINT #1 : LOCATE #1,2,13 : P
RINT #1,"in two minutes?"
64 FOR t = 1 TO 6500 : NEXT t
65 CLS #1 : CLS #2
70 PAPER #1,1 : PAPER #2,2
75 datum = INT(TIME/300) : n = 0
80 a = INT(RND*25)+97
90 PEN 3 : INK 3,26 : LOCATE #2,5,4 : PEN #2,3 : P
RINT #2,CHR$(a)
100 a$ = INKEY$ : IF a$ = "" THEN 100
110 IF a$ = CHR$(a) THEN n = n + 1
115 ticker = INT((TIME/300)-datum)
120 PEN 4 : INK 4,15 : PEN #1,4 : LOCATE #1,5,2 :
PRINT #1,n;" letters"
130 LOCATE #1,5,21 : PEN #1,4 : PRINT #1,"Time ";t
icker;"secs"
135 IF ticker > 120 THEN 200
140 GOTO 80
200 CLS #1 : CLS #2 : PAPER #1,1 : PAPER #2,2 : PE
N #1,3 : LOCATE #1,4,3 : PRINT #1,n;" letters"
210 LOCATE #2,3,2 : PRINT #2,"in 2"
220 LOCATE #2,2,5 : PRINT #2,"minutes"
230 LOCATE #1,1,18 : PRINT #1,"If you want another
 go, perhaps to try  and beat your total,hit any k
ey"
240 b$ = INKEY$ : IF b$ = "" THEN 240
250 GOTO 65
```

ALPHABETICAL ORDER

PARENTS- this is a program to check a child's ability to put a random set of five letters into alphabetical order and, where necessary, to give practice in this skill.

CHILDREN- how good are you at putting a group of letters into alphabetical order? When this program begins, you will be asked to choose capital letters or small letters to work with. The alphabet will then appear at the top of your screen to help you as you put your letters in the right order.



```
ABCDEFGHIJKLMNOPQRST
       UVWXYZ


        GNAEQ


     Put these in order
 with a comma between each one


           ? ■
```

As you type in the letters, you must put a comma after each one except the last letter which must have the ENTER key pressed after it.

PROGRAMMING HINT - REM

This command is used to place REMinders or REMarks in programs without affecting the program operation. The REM is there for the benefit of the programmer and is used to REMind him of what follows. Look for these REMarks throughout the listings.

```
1 REM alphabetical
10 DIM w$(25)
12 k = 5
14 WINDOW #1,1,40,1,25 : WINDOW #2,14,28,8,10 : WI
NDOW #3,10,32,18,20
16 PEN 0 : INK 0,10 : PEN 1 : INK 1,0 : PEN 2 : IN
K 2,7 : PEN 3 : INK 3,18
20 GOSUB 350
30 FOR a = 0 TO 25 : READ w$(a) : NEXT a
40 b = INT(RND*25) : c = INT(RND*25) : d = INT(RND
*25) : e = INT(RND*25) : f = INT(RND*25)
50 IF b = c OR b = d OR b = e OR b = f THEN 40
55 IF c = d OR c = e OR c = f THEN 40
60 IF d = e OR d = f THEN 40
65 IF e = f THEN 40
70 a$(1) = w$(b) : a$(2) = w$(c) : a$(3) = w$(d) :
 a$(4) = w$(e) : a$(5) = w$(f)
80 CLS #1 : PAPER #2,3 : CLS #2 : PAPER #3,2 : CLS
 #3
82 PRINT #1,"A B C D E F G H I J K L M N O P Q R S
 T"
83 LOCATE #1,15,3 : PRINT #1,"U V W X Y Z"
85 PEN #2,1 : LOCATE #2,3,2 : FOR g = 1 TO 5
87 PRINT #2," ";a$(g); : NEXT g
95 PEN #1,2 : LOCATE #1,12,14 : PRINT #1,"Put thes
e in order" : PRINT #1,"     with a comma between
each one"
100 PEN #3,1 : LOCATE #3,2,2 : INPUT #3,ab$,ac$,ad
$,ae$,af$
120 LOCATE #1,15,22 : PRINT #1,"Correct order" : L
OCATE #1,17,24 : GOSUB 175
130 IF a$(1) = ab$ AND a$(2) = ac$ AND a$(3) = ad$
 AND a$(4) = ae$ AND a$(5) = af$ THEN 150
140 PEN #1,3 : LOCATE #1,1,25 : FOR bd = 1 TO 10 :
 PRINT #1,"NO  "; : NEXT bd : FOR tt = 1 TO 3500 :
 NEXT tt
145 GOTO 12
150 PEN #1,3 : LOCATE #1,1,25 : FOR bd = 1 TO 6 :
PRINT #1,"GREAT "; : SOUND 1,345,20,7 : BORDER INT
(RND*27) : FOR tt = 1 TO 200 : NEXT tt : NEXT bd :
 GOTO 12
175 x = 0
180 FOR z = 1 TO k -1
190 s$ = a$(z) : r$ = a$(z+1)
200 IF s$ <= r$ THEN GOTO 250
210 e$ = a$(z)
220 a$(z) = a$(z+1)
230 a$(z+1) = e$
240 x = x + 1
```

```
250 NEXT z
260 IF x > 0 THEN k = k - 1 : GOTO 175
280 FOR i = 1 TO 5
290 PRINT #1," ";a$(i);
300 NEXT i
305 RETURN
350 BORDER 4 : PAPER #1,0 : CLS #1 : PEN #1,3
355 LOCATE #1,2,5 : PRINT #1,"A L P H A B E T I C
A L   O R D E R"
360 PEN #1,2 : LOCATE #1,1,10 : PRINT #1,"You must
 place the letters in order." : PRINT #1 : PRINT #
1,"Do you want 1) CAPITAL LETTERS"
365 LOCATE #1,9,14 : PRINT #1," or 2) small letter
s" : LOCATE #1,1,16 : PRINT #1,"Press 1 or 2"
370 PRINT #1 : INPUT #1,an$
375 IF an$ = "1" THEN RESTORE 420
380 IF an$ = "2" THEN RESTORE 400
385 RETURN
400 DATA a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u
,v,w,x,y,z
420 DATA A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U
,V,W,X,Y,Z
```

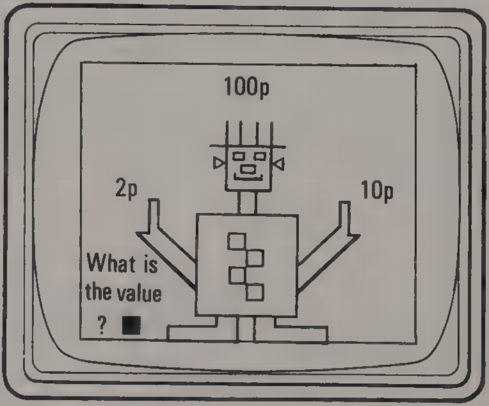
MONEY

JIG THE JUGGLER CHANGE POUNDS AND PENCE

JIG THE JUGGLER

PARENTS- it is always useful for young children to be able to add small amounts of money, especially when they wish to spend their pocket money on several small items!! This program is designed to give practice in adding three random amounts of money- though all the amounts correspond to our coins (1p, 2p, 5p, 10p, 20p, 50p and 100p). It would probably be helpful if the children had the real coins (plastic ones are a useful substitute, though not as good as the real thing) that they could handle when they first deal with sums of money.

CHILDREN- meet Jig the Juggler and watch the coins that he juggles with very carefully because he will ask you their value.



Add up the three coins and type your answer into the computer. Remember to press the ENTER key. If you are right, Jig's eyes will flash but, if you are wrong, Jig will tell you the right answer.

You can have as many goes as you like.

```
1 REM jig
20 DIM b$(7)
25 m$ = CHR$(143)+CHR$(143)+CHR$(143)
27 n$ = CHR$(32)+CHR$(32)+CHR$(32)+CHR$(32)
30 PEN 0 : INK 0,0 : PEN 1 : INK 1,6 : PEN 2 : INK
 2,24 : PEN 3 : INK 3,26
40 FOR a = 1 TO 7 : READ b$(a) : NEXT a
100 x = INT(RND*7)+1
101 ON x GOSUB 550,551,552,553,554,555,556
102 y = INT(RND*7)+1
103 ON y GOSUB 560,561,562,563,564,565,566
104 z = INT(RND*7)+1
105 ON z GOSUB 570,571,572,573,574,575,576
110 CLS : GOSUB 350
120 GOSUB 440
130 PEN 3 : LOCATE 1,19 : PRINT "What is the" : PR
INT "value" : PRINT
140 INPUT ans : LOCATE 6,22 : PRINT "p"
150 IF ans = r+s+v THEN 200
160 SOUND 1,2025,20,7,0,0,15 : FOR t = 1 TO 200 :
NEXT t : LOCATE 30,18 : PRINT"** N O **" : LOCATE
24,21 : PRINT "Answer is ";r+s+v"p" : FOR t = 1 TO
 3000 : NEXT t : GOTO 100
200 GOSUB 500 : LOCATE 30,18 : PRINT "G O O D" : G
OSUB 520 : GOTO 100
300 DATA "1p","2p","5p","10p","20p","50p","100p"
350 PEN 1 : FOR c = 0 TO 7 : FOR d = 0 TO 9 : LOCA
TE 16+c,14+d : PRINT CHR$(143) : NEXT d : NEXT c
355 FOR c = 0 TO 4 : PEN 3 : LOCATE 14+c,25 : PRIN
T CHR$(143) : LOCATE 21+c,25 : PRINT CHR$(143) : N
EXT c
360 LOCATE 17,24 : PRINT CHR$(143)CHR$(143) : LOCA
TE 21,24 : PRINT CHR$(143)CHR$(143)
365 PEN 1 : LOCATE 19,12 : PRINT CHR$(138)CHR$(133
) : LOCATE 19,13 : PRINT CHR$(138)CHR$(133)
370 PEN 2 : FOR c = 0 TO 1 : LOCATE 12,12+c : PRIN
T CHR$(143) : LOCATE 27,12+c : PRINT CHR$(143) : N
EXT c
375 PEN 1 : LOCATE 12,14 : PRINT CHR$(213)CHR$(215
) : LOCATE 13,15 : PRINT CHR$(143)CHR$(215) : LOCA
```

```
TE 13,16 : PRINT CHR$(213)CHR$(143)CHR$(215) : LOC
ATE 14,17 : PRINT CHR$(213)CHR$(143) : LOCATE 15,1
8 : PRINT CHR$(213)
380 LOCATE 26,14 : PRINT CHR$(214)CHR$(212) : LOCA
TE 25,15 : PRINT CHR$(214)CHR$(143) : LOCATE 24,16
 : PRINT CHR$(214)CHR$(143)CHR$(212) : LOCATE 24,1
7 : PRINT CHR$(143)CHR$(212) : LOCATE 24,18 : PRIN
T CHR$(212)
390 FOR c = 0 TO 3 : FOR d = 0 TO 3 : LOCATE 18+c,
8+d : PRINT CHR$(143) : NEXT d : NEXT c
400 FOR c = 0 TO 3 : FOR d = 0 TO 1 : LOCATE 18+c,
6+d : PEN 2 : PRINT CHR$(149) : NEXT d : NEXT c
405 LOCATE 16,8 : PRINT CHR$(208)CHR$(208) : LOCAT
E 22,8 : PRINT CHR$(208)CHR$(208)
410 PEN 1 : LOCATE 17,9 : PRINT CHR$(246)CHR$(143)
CHR$(142)CHR$(141)CHR$(143)CHR$(247)
415 LOCATE 18,10 : PRINT CHR$(135)CHR$(141)CHR$(14
2)CHR$(139)
420 LOCATE 18,11 : PRINT CHR$(141)CHR$(140)CHR$(14
0)CHR$(142)
425 PEN 3 : LOCATE 19,16 : PRINT CHR$(143) : LOCAT
E 20,18 : PRINT CHR$(143) : LOCATE 19,20 : PRINT C
HR$(143) : LOCATE 20,22 : PRINT CHR$(143)
430 RETURN
440 FOR e = 1 TO 2
450 PEN 2 : LOCATE 29,10 : PRINT b$(x) : LOCATE 29
,11 : PRINT m$ : GOSUB 500 : LOCATE 29,10 : PRINT
n$ : LOCATE 29,11 : PRINT n$ : GOSUB 500 : LOCATE
19,1 : PRINT b$(x) : LOCATE 19,2 : PRINT m$ : GOSU
B 500
455 LOCATE 29,10 : PRINT n$ : LOCATE 29,10 : PRINT
 b$(y) : LOCATE 29,11 : PRINT m$ : GOSUB 500
460 LOCATE 29,10 : PRINT n$ : LOCATE 29,11 : PRINT
 n$ : LOCATE 19,1 : PRINT n$ : LOCATE 19,2 : PRINT
 n$ : GOSUB 500
465 LOCATE 8,10 : PRINT n$ : LOCATE 8,10 : PRINT b
$(x) : LOCATE 8,11 : PRINT m$ : GOSUB 500 : LOCATE
 19,1 : PRINT n$ : LOCATE 19,1 : PRINT b$(y) : LOC
ATE 19,2 : PRINT m$ : GOSUB 500 : LOCATE 29,10 : P
RINT n$ : LOCATE 29,10 : PRINT b$(z)
468 LOCATE 29,11 : PRINT m$
469 GOSUB 500 : IF e = 2 THEN 480
470 LOCATE 8,11 : PRINT n$ : LOCATE 8,10 : PRINT n
$ : LOCATE 19,1 : PRINT n$ : LOCATE 19,2 : PRINT n
$ : LOCATE 29,10 : PRINT n$ : LOCATE 29,11 : PRINT
 n$
475 NEXT e
480 RETURN
500 SOUND 1,30,20,7 : FOR t = 1 TO 500 : NEXT t :
RETURN
```

```
520 PEN 1 : FOR p = 1 TO 5 : LOCATE 19,9 : PRINT C
HR$(143)CHR$(143) : GOSUB 500 : LOCATE 19,9 : PRIN
T CHR$(142)CHR$(141) : GOSUB 500 : NEXT p : RETURN
550 r = 1 : RETURN
551 r = 2 : RETURN
552 r = 5 : RETURN
553 r = 10 : RETURN
554 r = 20 : RETURN
555 r = 50 : RETURN
556 r = 100 : RETURN
560 s = 1 : RETURN
561 s = 2 : RETURN
562 s = 5 : RETURN
563 s = 10 : RETURN
564 s = 20 : RETURN
565 s = 50 : RETURN
566 s = 100 : RETURN
570 v = 1 : RETURN
571 v = 2 : RETURN
572 v = 5 : RETURN
573 v = 10 : RETURN
574 v = 20 : RETURN
575 v = 50 : RETURN
576 v = 100 : RETURN
```

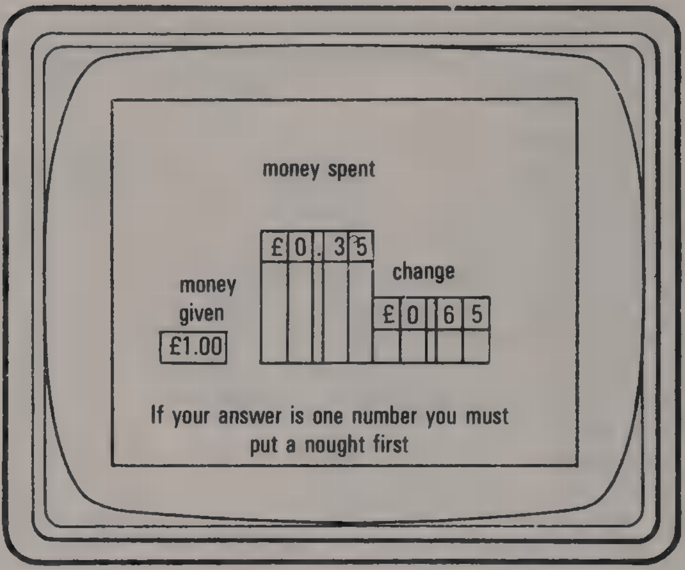
CHANGE

PARENTS- as children become more proficent at adding small amounts of money when they are out shopping, it then becomes advantageous if they can work out the change that they must expect from, perhaps, ■ pound note.

This is a simple program designed to give practice in subtracting random amounts of money from a pound. As with Jig the Juggler, access to ■ supply of coins (real or plastic) would be useful, though not essential.

CHILDREN- when you are out shopping and you buy something with your pocket money, it is a good thing if you know how much change you need to be given. This program will help you to work out the change you would need from a £1 after spending different amounts of money. There is no need to press the ENTER key this time.

Your screen will look like this:-



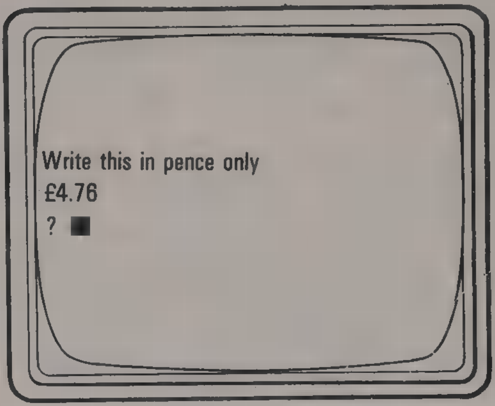
```
1 REM change
20 PRINT CHR$(22)+CHR$(1)
30 PEN 0 : INK 0,0 : PEN 1 : INK 1,6 : PEN 2 : INK
 2,24 : PEN 3 : INK 3,26
100 CLS : GOSUB 300
110 PEN 3 : LOCATE 1,23 : PRINT "If your answer is
 one number you must   put a nought first."
112 PEN 3 : LOCATE 3,15 : PRINT "money given" : LO
CATE 15,8 : PRINT "money spent" : LOCATE 27,12 : P
RINT "change"
120 x = INT(RND*9)+1 : y = INT(RND*10)
130 PEN 2 : LOCATE 21,12 : PRINT x : LOCATE 23,12
: PRINT y
140 a$ = INKEY$ : IF a$ = "" THEN 140
145 LOCATE 31,16 : PRINT a$ : GOSUB 280
147 b$ = INKEY$ : IF b$ = "" THEN 147
150 LOCATE 33,16 : PRINT b$ : GOSUB 280
160 d = ASC(a$) : d = d-48
162 e = ASC(b$) : e = e-48
168 h = (x*10) + y + (d*10) + e
169 j = 100 - ((x*10) + y)
170 IF 100 = h THEN 200
180 LOCATE 12,3 : PEN 3 : PRINT "**** N O ****"
```

```
185 PRINT "Answer is ";j;"p"
188 FOR t = 1 TO 2500 : NEXT t : GOTO 100
200 FOR q = 1 TO 8 : BORDER INT(RND*27) : SOUND 1,
478,20 : FOR t = 1 TO 200 : NEXT t : LOCATE (q*4)+
1,5 : PEN INT(RND*3)+1 : PRINT "GOOD" : NEXT q
205 GOTO 100
280 SOUND 1,60,20,7 : FOR t = 1 TO 200 : NEXT t :
RETURN
300 FOR a = 242 TO 306 STEP 32 : PLOT a,80,2 : DRA
W a,240,2 : NEXT a : FOR a = 322 TO 386 STEP 32 :
PLOT a,80,2 : DRAW a,240,2 : NEXT a
305 PLOT 242,80,2 : DRAW 534,80,2 : PLOT 242,195 :
 DRAW 386,195 : PLOT 242,240 : DRAW 386,240
310 FOR a = 422 TO 454 STEP 32 : PLOT a,80,2 : DRA
W a,176,2 : NEXT a : FOR a = 470 TO 534 STEP 32 :
PLOT a,80,2 : DRAW a,176,2 : NEXT a
315 PLOT 386,176,2 : DRAW 534,176,2
320 PLOT 386,128,2 : DRAW 534,128,2
330 PEN 1 : LOCATE 17,12 : PRINT "#" : LOCATE 19,1
2 : PRINT "O" : LOCATE 26,16 : PRINT "#" : LOCATE
28,16 : PRINT "O"
332 GOSUB 280
335 FOR a = 0 TO 5 : FOR b = 0 TO 5 : PLOT 312+a,2
15+b,1 : PLOT 460+a,152+b,1 : NEXT b : NEXT a
340 PLOT 64,80,3 : DRAW 64,128,3 : DRAW 192,128 :
DRAW 192,80 : DRAW 64,80
345 PEN 2 : LOCATE 6,19 : PRINT "#1.00"
347 GOSUB 280
350 RETURN
```

POUNDS AND PENCE

PARENTS- some children do not realise that there are two ways of writing the same amount of money. For instance, 75p can be written as £0.75 . This program gives practice in converting sums of money written with the 'p' sign to the equivalent amount using the '£' sign with the decimal point, and vice versa.

CHILDREN- there are two ways of writing the same amount of money. One way is to use the letter 'p' when we are thinking about a number of pence. The other way is to use a '£' sign and a decimal point- the number(s) between the £ and the decimal point shows you how many whole pounds you have; the decimal point separates the pounds from the remaining pence. You MUST always have two numbers after the decimal point- if you have only one number, you must put a nought(zero) in front of it, e.g. 7p becomes £0.07 Either way of writing a sum of money is correct and you need to be able to use both ways.



```
Write this in pence only
£4.76
? ■
```

PROGRAMMING HINT - LIST

If you want to see your program LISTing at any time, type `LIST` and press ENTER Your program will then be LISTed on the screen.

`LIST -200` will list your program to line 200.

`LIST 200-` will list your program from line 200 .

`LIST 50-100` will list your program from line 50 to line 100.

```
1 REM pounds/pence
20 PEN 0 : INK 0,0 : PEN 1 : INK 1,26
50 m = INT(RND*2)+1
52 CLS : PAPER 0
55 ON m GOTO 100,200
100 x = INT(RND*900)+1
110 LOCATE 1,5 : PRINT "Write this in pence only"

120 PRINT : PRINT "#"x/100
130 PRINT : INPUT z : LOCATE 6,9 : PRINT "p"
140 IF z = x THEN 160
150 PRINT : PRINT "No answer is "x"p"
155 FOR t = 1 TO 3000 : NEXT t : GOTO 50
160 PRINT : PRINT : PRINT "GREAT" : GOSUB 300
170 GOTO 50
```

```
200 x = INT(RND*899)+100
210 LOCATE 1,5 : PRINT "Write this with a decimal
point."
215 PRINT : PRINT x : LOCATE 5,7 : PRINT "p"
220 PRINT : PRINT "#" : LOCATE 3,9 : INPUT ;y
230 IF y = x/100 THEN 250
240 PRINT : PRINT "No, answer is #"x/100
245 FOR t = 1 TO 3000 : NEXT t : GOTO 50
250 PRINT : PRINT : PRINT "GREAT" : GOSUB 300 : GO
TO 50
300 FOR h = 1 TO 10 : BORDER INT(RND*27) : SOUND 1
,h*50,29 : FOR t = 1 TO 200 : NEXT t : NEXT h
305 RETURN
```

TEN GREEN BOTTLES

PARENTS- this program, whilst playing the tune "Ten Green Bottles", introduces children to algebraic substitution through seven types of equations:-

$16 - Y = 7$

$10 + Y = 13$

$X + 1 = 10$

$X - 9 = 10$

$10X - 2 = 98$

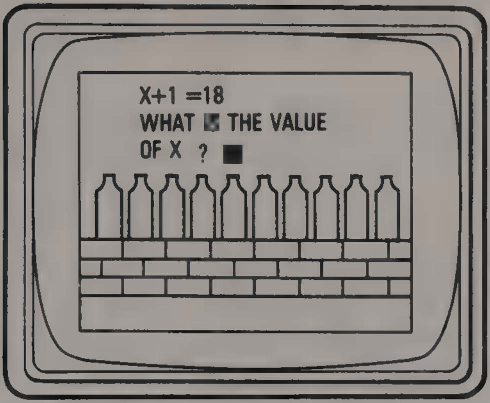
$6X + 2 = 8$

$\frac{X}{7} - 9 = 1$

As they progress through this unusual version of the traditional song, algebra will become fun for them to learn.

CHILDREN- have you ever knocked bottles off a wall by answering questions in algebra? No! Well now is your chance! Look carefully at each of the number sentences and you will find that there is a letter instead of a number. You need to discover the number to put in place of the letter to make this sentence true. When you type in your answer, remember to press ENTER .

For example:-



```
X+1 =18
WHAT IS THE VALUE
OF X ? ■
```

X + 1 = 18

17 + 1 = 18

So the value of X is 17

Type 17 ENTER

If you are right, your bottle will crash to the floor. If you are wrong, have a go at another question. As you play "Ten Green Bottles" algebra is fun to learn!

TYPING TIP

Between lines 150 and 460, you will notice extra spaces within the `PRINT` statement. You must be careful to type these out exactly as you see them, otherwise the statements which appear on the screen may look untidy.

PROGRAMMING HINT - `PRINT ;`

In all the programs, you will notice the semi-colon ; appear with the PRINT statement. This means that the characters will follow on.

Try this program:-

```
10 PRINT "Hello"
20 GOTO 10
```

Did you get a column of the word `"Hello"`? Now type this into your computer

```
10 PRINT "Hello";
20 GOTO 10
```

What happened? Can you see the difference? Look for the semi-colon in the listings.

```
1 REM ten-green-bottles
5 brick$ = CHR$(233)+CHR$(233)+CHR$(233)+CHR$(233)
6 b$ = CHR$(143)+CHR$(143) : c$ = CHR$(32)+CHR$(32
)
10 INK 1,24 : INK 2,6 : INK 3,18 : INK 0,0
20 WINDOW #1,1,40,1,10
25 WINDOW #2,1,40,11,21
30 WINDOW #3,1,40,22,25
35 PAPER #1,0 : PAPER #2,0 : PAPER #3,0
40 CLS #1 : CLS #2 : CLS #3
50 GOSUB 700 : GOSUB 750
52 LOCATE #1,11,3 : PEN #1,1 : PRINT #1,"TEN  GREE
N  BOTTLES" : LOCATE #1,6,5 : PRINT #1,"KNOCK  BOT
TLES  OFF  THE  WALL" : LOCATE #1,4,7 : PRINT #1,"
BY  FINDING  THE  MISSING  NUMBER"
53 GOSUB 850 : CLS #1
55 count = 0
60 CLS #1
70 IF count = 10 THEN 800
100 h = INT(RND*7)+1
105 ON h GOTO 150,200,250,300,350,400,450
150 x = INT(RND*7)+1 : z = INT(RND*10)+10
155 LOCATE #1,13,2 : PEN #1,1 : PRINT #1,x;"  +  Y
  =  ";z : GOSUB 550 : LOCATE #1,16,6 : PRINT #1,"
O F   Y"
160 LOCATE #1,19,8 : INPUT #1,y
165 IF z <> x+y THEN GOSUB 580
167 GOSUB 640 : GOSUB 600
170 GOTO 60
200 x = INT(RND*10)+1 : z = INT(RND*10)+1 : y = IN
T(RND*10)+1 : d = (x*y)-z
205 IF x*y < z THEN 200
210 LOCATE #1,13,2 : PEN #1,1 : PRINT #1,y : LOCAT
E #1,15,2 : PRINT #1,"X  -  ";z;"  =  ";d : GOSUB
550 : LOCATE #1,16,6 : PRINT #1,"O F  X"
215 LOCATE #1,19,8 : INPUT #1,j
220 IF j <> x THEN GOSUB 580
225 GOSUB 640 : GOSUB 600
230 GOTO 60
250 y = INT(RND*10)+1 : z = INT(RND*10)+10
255 LOCATE #1,13,2 : PEN #1,1 : PRINT #1,"X  +  ";
y;"  =  ";z : GOSUB 550 : LOCATE #1,16,6 : PRINT #
```

```
1,"O F  X"
260 LOCATE #1,19,8 : INPUT #1,x
265 IF x <> z - y THEN 580
270 GOSUB 640 : GOSUB 600
275 GOTO 60
300 w = INT(RND*10)+1 : x = INT(RND*10)+1 : z = IN
T(RND*10)+1 : y = w*x : d = (y/x)-z
305 IF y/x<z THEN 300
310 LOCATE #1,13,1 : PEN #1,1 : PRINT #1,"Y  -  ";
z;"  =  ";d : LOCATE #1,13,2 : PRINT #1,CHR$(154)
: LOCATE #1,12,3 : PRINT #1,X
315 GOSUB 550 : LOCATE #1,16,6 : PRINT #1,"O F  Y"
320 LOCATE #1,19,8 : INPUT #1,f
325 IF f <> w*x THEN 580
330 GOSUB 640 : GOSUB 600 : GOTO 60
350 x = INT(RND*10)+10 : z = INT(RND*10)+1
355 LOCATE #1,13,2 : PRINT #1,x;"  -  Y  =  ";z :
GOSUB 550 : LOCATE #1,16,6 : PRINT #1,"O F  Y"
360 LOCATE #1,19,8 : INPUT #1,y
365 IF z <> x-y THEN 580
370 GOSUB 640 : GOSUB 600 : GOTO 60
400 y = INT(RND*10)+1 : z = INT(RND*10)+1
405 LOCATE #1,13,2 : PRINT #1,"x  -  ";y;"  =  ";z
 : GOSUB 550 : LOCATE #1,16,6 : PRINT #1,"O F  X"
410 LOCATE #1,19,8 : INPUT #1,x
415 IF x <> z+y THEN 580
420 GOSUB 640 : GOSUB 600 : GOTO 60
450 y = INT(RND*9)+1 : z = INT(RND*10)+1 : x = INT
(RND*10)+1 : d = (x*y)+z
455 LOCATE #1,13,2 : PRINT #1,y : LOCATE #1,15,2 :
 PRINT #1,"X  +  ";z;"  =  ";d
460 GOSUB 550 : LOCATE #1,16,6 : PRINT #1,"O F  X"

465 LOCATE #1,19,8 : INPUT #1,f
470 IF f <> x THEN 580
475 GOSUB 640 : GOSUB 600 : GOTO 60
550 LOCATE #1,6,4 : PEN #1,3 : PRINT #1,"W H A T
I S  T H E  V A L U E" : RETURN
580 LOCATE #1,7,10 : PEN #1,2 : PRINT #1,"N O" : F
OR T = 1 TO 3000 : NEXT T : GOTO 60
600 PEN #3,2 : LOCATE #3,16,2 : PRINT #3,CHR$(67)C
HR$(32)CHR$(82)CHR$(32)CHR$(65)CHR$(32)CHR$(83)CHR
$(32)CHR$(72)
610 FOR ww = 7 TO 0 STEP -1 : SOUND 1,478,10,ww,7,
7,15 : NEXT  ww : FOR t = 1 TO 400 : NEXT t
620 LOCATE #3,16,2 : PRINT #3,CHR$(32)c$;c$;c$;c$
: FOR t = 1 TO 500 : NEXT t : RETURN
640 count = count +1
650 IF count = 1 THEN e = 0
652 IF count = 2 THEN e = 4
```

```
654 IF count = 3 THEN e = 8
656 IF count = 4 THEN e = 12
658 IF count = 5 THEN e = 16
660 IF count = 6 THEN e = 20
662 IF count = 7 THEN e = 24
664 IF count = 8 THEN e = 28
666 IF count = 9 THEN e = 32
668 IF count = 10 THEN e = 36
669 FOR f = 1 TO 2
670 LOCATE #2,2+e,1 : PRINT #2,CHR$(138)CHR$(133)
: LOCATE #2,2+e,2 : PRINT #2,CHR$(142)CHR$(141)
675 FOR d = 0 TO 4 : LOCATE #2,2+e,3+d : PRINT #2,
b$ : NEXT d
680 SOUND 1,67,50,6 : FOR t = 1 TO 150 : NEXT t
685 LOCATE #2,2+e,1 : PRINT #2,c$ : LOCATE #2,2+e,
2 : PRINT #2,c$ : FOR d = 0 TO 4 : LOCATE #2,2+e,3
+d : PRINT #2,c$ : NEXT d
687 FOR t = 1 TO 500 : NEXT t : NEXT f : RETURN
700 LOCATE #2,1,8 : FOR c = 0 TO 1 : FOR b = 0 TO
4 : PEN #2,2 : PRINT #2,brick$; : PEN #2,3 : PRINT
 #2,brick$; : NEXT b
710 PEN #2,3 : PRINT #2,CHR$(233)CHR$(233); : FOR
b = 0 TO 3 : PEN #2,2 : PRINT #2,brick$; : PEN #2,
3 : PRINT #2,brick$; : NEXT b
720 PEN #2,2 : PRINT #2,brick$; : PEN #2,3 : PRINT
 #2,CHR$(233)CHR$(233);
730 NEXT c : RETURN
750 PEN #2,1 : FOR a = 0 TO 36 STEP 4 : LOCATE #2,
2+a,1 : PRINT #2,CHR$(138)CHR$(133) : LOCATE #2,2+
a,2 : PRINT #2,CHR$(142)CHR$(141)
760 FOR d = 0 TO 4 : LOCATE #2,2+a,3+d : PRINT #2,
b$ : NEXT d : SOUND 1,16,10,5 : FOR t = 1 TO 400 :
 NEXT t : NEXT a : RETURN
800 LOCATE #1,7,3 : PEN #1,6 : PRINT #1,"GREAT  YO
U HAVE KNOCKED" : LOCATE #1,8,5 : PRINT #1,"TEN BO
TTLES OFF THE WALL"
805 GOSUB 850 : CLS #1 : LOCATE #1,1,5 : PRINT #1,
"Type...run...and press..RETURN...for     another g
o." : END
850 RESTORE : FOR n = 1 TO 51
855 READ m : READ q : SOUND 1,m,q,7 : NEXT n
860 RETURN
900 DATA 478,75,0,10,478,75,0,10,478,40,379,75,0,1
0,426,30,478,25,426,40,379,25,478,85,379,75
905 DATA 0,10,379,75,0,10,379,42,319,75,358,30,379
,15,358,40,319,30,379,85,478,42,0,10,478,42,284,75
,0,10,284,75,319,30,379,42,478,30,426,30,379,20,42
6,30,478,30,568,75,638,85,0,10,638,85,478,75,0,10,
478,75,0,10,478,42,379,75,426,30
910 DATA 478,42,426,75,379,30,478,85
```

CRACK-THE-CODE

PARENTS- this is a good basic program to test and improve logical understanding and thinking, and there is plenty of scope for developing graphics. The aim of the program is to guess the secret code - a four-digit number, selected at random, but where each digit is different.

CHILDREN- how good are you at cracking secret codes? Here is your chance to find out! The computer will choose a four-digit number and each digit will be different. E.g. 3 6 9 4. You have to guess the number.

The computer will ask you to enter four numbers. You MUST press the comma key < after entering each of the first three digits and ENTER after the fourth.

For example:-

2 press <,

8 press <,

1 press <,

5 press ENTER

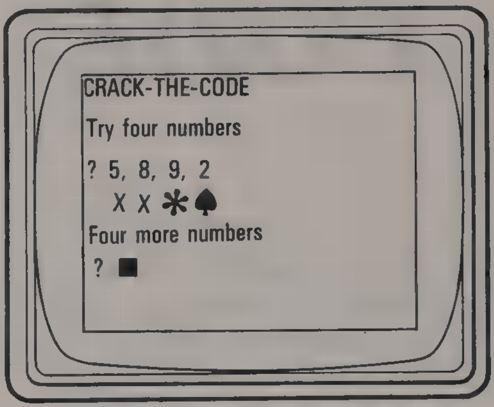
The computer will then inform you if you are right or not by using the following symbols:-

X informing you that the number is not in the code.

* informing you that the number appears in the code and is in the correct place.

or ♠ informing you that the number is in the code but in the wrong place.

Your screen will look something like this:-



```
CRACK-THE-CODE
Try four numbers
? 5, 8, 9, 2
   X X * ♠
Four more numbers
? ■
```

At the end of the program, when you have cracked the code, you will be told how many guesses it took you. Have another go to see if you can beat your score.

PROGRAMMING HINT - BORDER COLOURS

You can change the colour of the BORDER of your screen by adding any of the colour numbers from the Master Colour Chart (Amstrad User Guide, page F3.2). Type BORDER 3 (press ENTER) and your BORDER colour will change to red. Type BORDER 24 (press ENTER) and your BORDER colour will change to bright yellow.

Try this program which should give you all the border colours with a pause between each change of colour.

```
10 FOR c = 0 to 26

20 BORDER c

30 FOR t= 1 to 500 : NEXT t

40 NEXT c
```

```
10 REM code
40 MODE 0
50 BORDER 0 : CLS : PAPER 2 : PEN 3
60 INK 2,9,10 : INK 3,26
70 LOCATE 4,7
80 PRINT "CRACK-THE-CODE"
90 LOCATE 4,10
100 PRINT "ADJN      1984"
110 FOR t = 1 TO 4000 : NEXT t
120 INK 2,8 : INK 3,26
130 g = 0
140 a = INT(RND*10)
150 b = INT(RND*10)
160 c = INT(RND*10)
170 d = INT(RND*10)
180 IF a = b OR a = c OR a = d OR b = c OR b = d O
R c = d THEN 140
190 CLS : LOCATE 1,2 : PRINT "Crack-The-Code"
200 PRINT "Try four numbers"
210 INK 3,26
220 INPUT w,x,y,z
230 g = g + 1
240 IF a = w AND b = x AND c = y AND d = z THEN 50
0
250 IF a = w THEN PRINT "  *"; : GOTO 280
260 IF w = b OR w = c OR w = d THEN PRINT "  ";CHR
$(229); : GOTO 280
270 PRINT "  X";
280 IF b = x THEN PRINT " *"; : GOTO 320
290 IF x = a OR x = c OR x = d THEN PRINT " ";CHR$
(229); : GOTO 320
300 PRINT " X";
320 IF c = y THEN PRINT " *"; : GOTO 360
330 IF y = a OR y = b OR y = d THEN PRINT " ";CHR$
(229); : GOTO 360
340 PRINT " X";
360 IF d = z THEN PRINT " *" : GOTO 400
370 IF z = a OR z = b OR z = c THEN PRINT " ";CHR$
(229) : GOTO 400
380 PRINT " X"
400 PRINT "Four more numbers"
410 GOTO 220
500 PRINT "JACKPOT"
510 PRINT "code was";a;b;c;d
520 PRINT "It took you";g;" goes"
530 FOR m = 0 TO 5
540 FOR n = 1 TO 7
550 SOUND 1,478,5,n
560 NEXT n : NEXT m
570 END
```

ALIENS

PARENTS- this program gives practice in subtraction, whilst trying to land the ALIEN spacecraft. The program begins by giving the choice of numbers to be used - eight different groups between 0 and 1000. As the program can easily be used by very young children they will require initial help in deciding the range of numbers to be used.

CHILDREN- land your spacecraft safely by correctly answering the subtraction problems. A safe landing will bring out the ALIENS to greet you! The program begins by asking you to choose the degree of difficulty of your sums. Numbers between:-

a) 1 and 10

b) 1 and 20

c) 10 and 20

d) 20 and 50

e) 50 and 100

f) 100 and 200

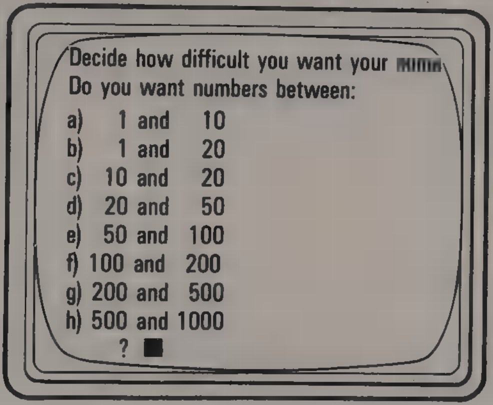
g) 200 and 500

h) 500 and 1000

you must press the letter showing the numbers that you require and then press the ENTER key.

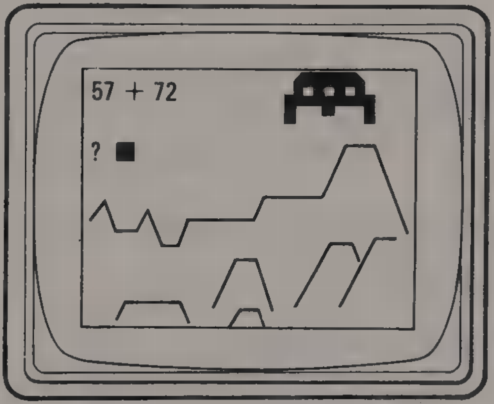
Move your spacecraft to make a safe landing by answering the sums correctly. After you have typed in the answer you must press the ENTER key.

Your screen will look like this:-



```
Decide how difficult you want your [illegible]
Do you want numbers between:
a)    1 and   10
b)    1 and   20
c)   10 and   20
d)   20 and   50
e)   50 and  100
f) 100 and  200
g) 200 and  500
h) 500 and 1000
     ? ■
```

and



```
57 + 72

? ■
```

PROGRAMMING HINT - DELETE NEW

Erasing lines or sections of a program is extremely easy and because of this the DELETE command must be used carefully. To erase a line, type the number of the line then press ENTER . For example:-

670 ENTER will erase line 670.

DELETE 300-500 will erase all the lines from 300 to 500.

`DELETE 200-` will erase all the lines from 200 to the end of the program.

`DELETE -300` will erase all the lines from the beginning of the program to 300.

`NEW` will erase all the current program in the machine.

Beware of these commands!!

```
1 REM aliens
10 z$ = CHR$(143)+CHR$(143)+CHR$(143)+CHR$(143)+CH
R$(143) : y$ = CHR$(143)+CHR$(143)
15 x$ = CHR$(32)+CHR$(32)+CHR$(32)
30 PRINT #1,CHR$(22)+CHR$(0)
40 PEN 1 : INK 1,22 : PEN 2 : INK 2,0 : PEN 3 : IN
K 3,26 : PEN 0 : INK 0,3
45 WINDOW #1,1,40,1,25
47 WINDOW #2,1,13,1,4
48 GOSUB 550
50 BORDER 22 : PAPER #1,1 : PAPER #2,1
60 CLS #1 : CLS #2
65 d = 0
70 GOSUB 300
75 CLS #2
80 e = INT(RND*f)+h : g = INT(RND*f)+h
90 PEN #2,0 : LOCATE #2,1,1 : PRINT #2,e;" + ";g
100 LOCATE #2,1,3 : INPUT #2,ans
110 IF ans <> e + g THEN PRINT #2,"no,try again" :
 GOSUB 290 : GOTO 75
120 PRINT #2,"good" : GOSUB 280 : d = d + 1 : GOSU
B 390 : GOSUB 400 : GOSUB 350
130 IF d = 10 THEN 500
135 GOTO 75
280 SOUND 1,119,20,6 : RETURN
290 FOR t = 1 TO 2500 : NEXT t : RETURN
300 PLOT 0,210,2 : DRAW 30,240,2 : DRAW 75,195 : D
RAW 105,195 : DRAW 135,225 : DRAW 180,180 : DRAW 1
95,180 : DRAW 210,207 : DRAW 355,207 : DRAW 375,24
0 : DRAW 465,240 : DRAW 510,285 : DRAW 555,285 : D
RAW 615,225
310 PLOT 15,45,2 : DRAW 45,75,2 : DRAW 90,75 : DRA
W 120,45 : PLOT 210,75,2 : DRAW 270,135 : DRAW 315
,135 : DRAW 375,75 : PLOT 405,75,2 : DRAW 495,165
: DRAW 525,165 : DRAW 555,135 : DRAW 495,75 : PLOT
 555,135,2 : DRAW 585,180 : DRAW 615,180
320 PLOT 255,0,2 : DRAW 300,45,2 : DRAW 345,45 : D
RAW 390,0 : RETURN
```

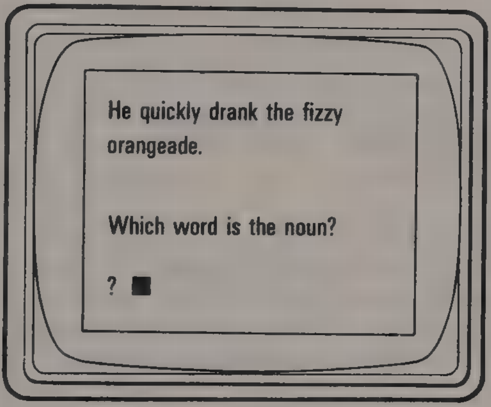
```
350 PEN #1,2 : LOCATE #1,a,b : PRINT #1,CHR$(214);
z$;CHR$(215) : LOCATE #1,a,b+1 : PRINT #1,z$;y$ :
LOCATE #1,a-1,b+2 : PRINT #1,z$;y$;y$
360 LOCATE #1,a-1,b+3 : PRINT #1,CHR$(143);x$;CHR$
(143);x$;CHR$(143) : LOCATE #1,a-1,b+4 : PRINT #1,
CHR$(143);x$;CHR$(131);x$;CHR$(143)
370 PEN #1,3 : FOR c = 0 TO 4 STEP 2 : LOCATE #1,a
+1+c,b+1 : PRINT #1,CHR$(143) : NEXT c
380 RETURN
390 IF d = 1 GOTO 395
392 FOR j = 0 TO 4 : LOCATE #1,a-1,b+j : PRINT #1,
x$;x$;x$ : NEXT j
395 RETURN
400 IF d = 1 THEN a = 32 : b = 1
405 IF d = 2 THEN a = 30 : b = 1
410 IF d = 3 THEN a = 28 : b = 2
415 IF d = 4 THEN a = 26 : b = 2
420 IF d = 5 THEN a = 24 : b = 3
425 IF d = 6 THEN a = 22 : b = 3
430 IF d = 7 THEN a = 20 : b = 3
435 IF d = 8 THEN a = 18 : b = 4
440 IF d = 9 THEN a = 16 : b = 6
445 IF d = 10 THEN a = 15 : b = 8
450 RETURN
500 PRINT #1,CHR$(22)+CHR$(1) : PEN #1,3 : FOR k =
 0 TO 10 : LOCATE #1,23+k,12 : PRINT #1,CHR$(250);
 : NEXT k
502 LOCATE #1,20,3 : PRINT #1,"Meet the aliens"
505 CLS #2 : PRINT #2,"Type run for another go" :
INPUT #2,h$
510 IF h$ = "run" THEN 10
525 END
550 CLS #1 : CLS #2 : BORDER 0 : PAPER #1,2 : PAPE
R #2,2 : PEN #1,3
555 LOCATE #1,1,1 : PRINT #1,"Decide how difficult
 you want your sums."
560 PRINT #1,"Do you want numbers between :"
565 PRINT #1 : PRINT #1 : PRINT #1,"a) 1 and 10" :
 PRINT #1 : PRINT #1,"b) 1 and 20"
570 PRINT #1 : PRINT #1,"c) 10 and 20" : PRINT #1
: PRINT #1,"d) 20 and 50"
575 PRINT #1 : PRINT #1,"e) 50 and 100" : PRINT #1
 : PRINT #1,"f) 100 and 200"
580 PRINT #1 : PRINT #1,"g) 200 and 500" : PRINT #
1 : PRINT #1,"h) 500 and 1000"
590 PRINT #1 : INPUT #1,p$
600 IF p$ = "a" THEN f = 10 : h = 1
602 IF p$ = "b" THEN f = 20 : h = 1
604 IF p$ = "c" THEN f = 10 : h = 10
```

```
606 IF p$ = "d" THEN f = 30 : h = 20
608 IF p$ = "e" THEN f = 50 : h = 50
610 IF p$ = "f" THEN f = 100 : h = 100
612 IF p$ = "g" THEN f = 300 : h = 200
614 IF p$ = "h" THEN f = 500 : h = 500
616 RETURN
```

V-A-N

PARENTS- this program will give practice in the recognition of verbs, adjectives and nouns.

CHILDREN- when you study English Language, it is necessary for you to be able to distinguish between different parts of speech. This program will give you practice in identifying verbs, adjectives and nouns.



```
He quickly drank the fizzy
orangeade.

Which word is the noun?

? ■
```

On the screen, you will see displayed ■ sentence. Underneath the sentence you will be asked "Which word is the noun?" (or verb or adjective). You have to choose the correct word to answer the question. Type it into the computer and press the ENTER key. If you are right, the screen border will flash different colours before going on to the next sentence. If you are wrong, the computer will go straight to the next sentence. Look carefully at the pattern of words in the sentence before you answer.

PROGRAMMING HINT - `SYNTAX ERROR IN ...`

If the message "`Syntax error in 65`" (65 represents any line number) appears on the screen, the computer has found something in line 65 that it does not understand. For instance, a command or function word may be mis-spelt or there maybe some other BASIC error. The line number in which there is a mistake will appear with the message.

```
1 REM v-a-n
10 DIM sen$(30) : DIM adj$(30) : DIM nou$(30) : DI
M ver$(30)
20 PEN 0 : INK 0,0 : PEN 1 : INK 1,8 : PEN 2 : INK
 2,15 : PEN 3 : INK 3,13
30 RESTORE 400 : FOR a = 0 TO 30 : READ sen$(a) :
READ adj$(a) : READ nou$(a) : READ ver$(a) : NEXT
a
50 BORDER 10 : PAPER 3 : CLS
60 b = INT(RND*31)
65 PEN 1 : LOCATE 2,5 : PRINT sen$(b)
67 PEN 2 : LOCATE 2,10 : PRINT "Which word is the
";
70 c = INT(RND*3)+1
80 ON c GOTO 100,150,200
100 PRINT "adjective?"
110 GOSUB 250
120 IF ans$ = adj$(b) THEN GOTO 300
130 GOTO 350
150 PRINT "noun?"
160 GOSUB 250
170 IF ans$ = nou$(b) THEN GOTO 300
180 GOTO 350
200 PRINT "verb?"
210 GOSUB 250
220 IF ans$ = ver$(b) THEN GOTO 300
230 GOTO 350
250 PEN 0 : LOCATE 2,13 : INPUT ans$ : RETURN
300 FOR d = 1 TO 12 : BORDER INT(RND*27) : SOUND 1
,239,20,7 : FOR t = 1 TO 200 : NEXT t : NEXT d
310 GOTO 50
350 FOR e = 1 TO 20 : PRINT "NO  "; : NEXT e : FOR
 f = 7 TO 2 STEP -1 : SOUND 1,2703,20,7,0,0,15 : F
OR t = 1 TO 150 : NEXT t : NEXT f
360 GOTO 50
400 DATA "We walked up the steep hill.",steep,hill
,walked
402 DATA "The old man was tired.",old,man,was tire
d
404 DATA "She had a hot bath.",hot,bath,had
406 DATA "The captive tiger roared fiercely.",capt
ive,tiger,roared
408 DATA "He sharpened the blunt pencils.",blunt,p
encils,sharpened
410 DATA "The young girl screamed loudly.",young,g
irl,screamed
412 DATA "The damaged plane landed safely.",damage
d,plane,landed
414 DATA "We followed the muddy footprints.",muddy
,footprints,followed
```

```
416 DATA "He quickly drank the fizzy orangeade.",f
izzy,orangeade,drank
418 DATA "The sick man spoke softly.",sick,man,spo
ke
420 DATA "He repaired the broken window.",broken,w
indow,repaired
422 DATA "We lost the blue ball.",blue,ball,lost
424 DATA "The crescent moon shone brightly.",cresc
ent,moon,shone
426 DATA "We looked at the twinkling stars.",twink
ling,stars,looked
428 DATA "She enjoyed the birthday party.",birthda
y,party,enjoyed
430 DATA "The old car ran smoothly.",old,car,ran
432 DATA "The huge bonfire burned brightly.",huge,
bonfire,burned
434 DATA "The black cat walked noiselessly.",black
,cat,walked
436 DATA "The careless burglar was caught easily."
,careless,burglar,was caught
440 DATA "I carefully studied the  torn
 time-table.",torn,time-table,studied
442 DATA "We laughed at the idiotic clown.",idioti
c,clown,laughed
444 DATA "We admired the colourful butterfly.",col
ourful,butterfly,admired
446 DATA "The submerged wreck was dangerous.",subm
erged,wreck,was dangerous
448 DATA "The cheeky sparrow chirped noisily.",che
eky,sparrow,noisily
450 DATA "She carefully held the baby bird.",baby,
bird,carefully
452 DATA "We stood by the swollen river.",swollen,
river,stood
454 DATA "I bought a crusty loaf.",crusty,loaf,bou
ght
456 DATA "He wore a blue jumper.",blue,jumper,wore
458 DATA "The golden daffodils were picked
 carefully.",golden,daffodils,were picked
460 DATA "The green tomatoes ripened slowly.",gree
n,tomatoes,ripened
462 DATA "The old man snored loudly.",old,man,snor
ed
```

JAIL

PARENTS- this is a game to develop logical thinking by working out the code number required to break out of JAIL. There is a choice of six degrees of difficulty:-

a) Numbers 1 - 20

b) Numbers 1 - 50

c) Numbers 1 - 100

d) Numbers 1 - 500

e) Numbers 1 - 1000

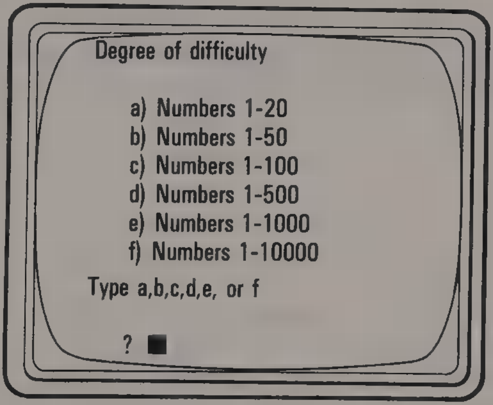
f) Numbers 1 - 10000

It gives the opportunity for the child to work against the clock, allowing, if you wish, only one minute to break out of JAIL.

Having decided the degree of difficulty, which can be done by an adult for the very young, then input any number between the chosen numbers. The computer which has randomly picked the code, will inform the child whether the inputted number is 'too small', 'too big' or correct. Then the logic begins to work out the next input number. A number line (a line of numbers in sequence), such as a ruler, will help the younger child. When the code has been found you have escaped from jail.

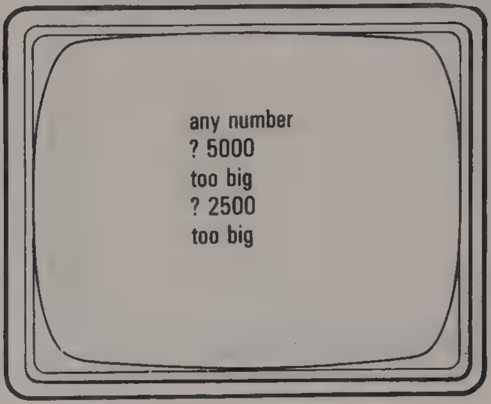
CHILDREN- captured in jail your thoughts turn to escape. The only way is to release the lock by finding the code number. Will you succeed? Your freedom screen will look like this:-

You will need to choose the degree of difficulty of the code, shown on the screen like this:



```
Degree of difficulty

   a) Numbers 1-20
   b) Numbers 1-50
   c) Numbers 1-100
   d) Numbers 1-500
   e) Numbers 1-1000
   f) Numbers 1-10000
Type a,b,c,d,e, or f

   ? ■
```

and, if you wish, to impose a time limit of one minute to break free. The idea is that you put a number into the computer and you will be told whether that number is 'too small', 'too big' or correct. It is then up to you to work out the next input number. Your screen will look like this:-



```
any number
? 5000
too big
? 2500
too big
```

You must remember to press the ENTER key after you have typed each number.

PROGRAMMING HINT - LOCATE 3,6

LOCATE is a useful command which moves the text cursor to a new position relative to the WINDOW being used. When no WINDOW is specified the entire screen is used. Hence LOCATE 3,6 moves the text cursor three columns along and six lines down. Your text is then printed. Of course you must use figures within your working mode.

```
1 REM jail
2 MODE 0
5 BORDER 0 : PAPER 0 : INK 0,0 : m = 0
10 GOSUB 620 : GOSUB 650
20 FOR a = 1 TO 10 : SOUND 1,127,20,5 : SOUND 1,47
8,20,6 : NEXT a
30 CLS : BORDER 22 : INK 0,22
40 PEN 5 : INK 5,6 : LOCATE 1,3 : PRINT "Degree of
 difficulty"
50 LOCATE 3,6 : PRINT "a) Numbers 1-20"
55 LOCATE 3,8 : PRINT "b) Numbers 1-50"
60 LOCATE 3,10 : PRINT "c) Numbers 1-100"
70 LOCATE 3,12 : PRINT "d) Numbers 1-500"
80 LOCATE 3,14 : PRINT "e) Numbers 1-1000"
90 LOCATE 3,16 : PRINT "f) Numbers 1-10000"
92 PRINT: PRINT "Type a,b,c,d,e or f"
94 LOCATE 5,22 : INPUT d$
```

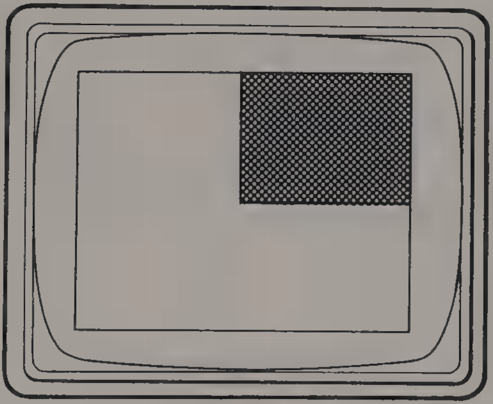
```
100 IF d$ ="a" THEN num = 20
102 IF d$ ="b" THEN num = 50
104 IF d$ ="c" THEN num = 100
106 IF d$ ="d" THEN num = 500
108 IF d$ ="e" THEN num = 1000
110 IF d$ ="f" THEN num = 10000
115 code = INT(RND*num)+1
140 CLS : BORDER 4 : INK 0,4 : PEN 3 : INK 3,6
150 LOCATE 2,8 : PRINT "Do you want to beat" : LOC
ATE 2,10 : PRINT "the clock ?"
152 LOCATE 2,12 : PRINT "yes or no"
156 LOCATE 2,16 : INPUT z$
160 IF z$ = "yes" THEN 170
162 IF z$ = "no" THEN 166
166 CLS : BORDER 0 : INK 0,0 : INK 2,26 : LOCATE 1
,1 : PRINT "any number" : GOTO 185
170 LOCATE 2,18 : PRINT "You have one minute to fi
nd the number"
172 FOR t = 1 TO 3500 : NEXT t
175 datum = INT(TIME/300)
180 CLS : BORDER 0 : INK 0,0 : INK 2,26 : LOCATE 1
,1 : PRINT "any number"
182 ticker = ((TIME/300)-datum)
183 IF ticker > 60 THEN 500
185 INPUT ans
190 IF ans < code THEN 300
195 IF ans > code THEN 400
200 PRINT "well done" : GOSUB 800 : m = 1 : GOSUB
620 : INK 2,26 : LOCATE 1,1 : PRINT "Great you bre
ak out" : LOCATE 15,2 : PRINT "of jail"
205 FOR t = 1 TO 3500 : NEXT t
210 CLS : GOSUB 620 : LOCATE 5,2 : PRINT "I'M FREE
" : GOSUB 800
220 LOCATE 1,4 : PEN 3 : INK 3,21 : PRINT "Do you
want another"
222 PRINT "game ? (yes/no)"
225 LOCATE 1,6 : INPUT f$
227 IF f$ = "no" THEN END
230 IF f$ = "yes" THEN 5
300 PRINT "too small" : IF z$ = "no" THEN 185
301 GOTO 182
400 PRINT "too big" : IF z$ = "no" THEN 185
401 GOTO 182
500 m = 1 : GOSUB 620 : GOSUB 800 : LOCATE 1,1 : P
RINT "out of time...."
505 LOCATE 3,2 : PRINT "..stay in jail.." : LOCATE
 5,3 : PRINT "..try again...."
510 FOR t = 1 TO 3500 : NEXT t : GOTO 115
620 PEN 1 : INK 1,11 : FOR r = 0 TO 420 STEP 60 :
CLS
```

```
625 PLOT 8+r,90 : DRAW 15+r,106 : DRAW 55+r,60 : D
RAW 90+r,128 : PLOT 132+r,6 : DRAW 117+r,16 : DRAW
 128+r,69 : DRAW 90+r,128 : DRAW 90+r,208 : DRAW 6
5+r,176 : DRAW 80+r,130
630 PLOT 158+r,192 : DRAW 120+r,176 : DRAW 90+r,20
8 : DRAW 90+r,224 : DRAW 84+r,218 : DRAW 84+r,240
: DRAW 99+r,250 : DRAW 99+r,230 : DRAW 90+r,224
632 IF m = 1 THEN 637
635 GOSUB 670
637 NEXT R : RETURN
650 PEN 2 : INK 2,9 : FOR s = 0 TO 600 STEP 30 : P
LOT 30+s,400 : DRAW 30+s,0 : NEXT s : RETURN
670 PEN 3 : INK 3,26 : PRINT "FIND THE CODE NUMBER
" : PRINT "TO BREAK OUT OF JAIL": RETURN
800 FOR b = 1 TO 5 : SOUND 1,119,10,6 : SOUND 1,84
.1,6 : SOUND 1,47,10,6 : NEXT b : RETURN
```

FLASH

PARENTS- a program to test your memory as four colours are flashed onto the screen. The order of colours then has to be typed into the computer's memory pressing ENTER after each colour has been written. The words must be spelt correctly but help is available with the correct spellings appearing on the screen.

CHILDREN- how good is your memory? Can you remember a sequence of colours? Have a go with this program. Four colours will flash on the screen and you must remember the order in which they appeared. The colours will flash in each quarter of the screen, working clockwise and beginning with the top left quarter. Then type in the order of colours pressing ENTER after each colour has been typed. Your screen will look like this:-



TYPING TIP- the colours only flash onto the screen for a short while but if [illegible] younger child is playing the game this can easily be changed by making the time pause at line 300 longer. Do this by increasing the figure 500 to 600, 700, 800 or by any number that you wish.

PROGRAMMING HINT - `PEN` `INK`

Line 5 lists all the `PEN` and `INK` colours that the program uses and by putting all these at the beginning of the program reference to these can be made at any time throughout the program. The program is written in `MODE` [illegible] (line 3) and in this mode it is possible to use 16 of the 27 colours available.

`PEN 0 : INK 0,0` gives `PEN` number 0 the colour of `INK` number 0 (black)

`PEN 1 : INK 1,1` gives `PEN` number 1 the colour of `INK` number 1 (blue)

`PEN 2 : INK 2,26` gives `PEN` number 2 the colour of `INK` number 26 (bright white).

You will see that the two `INK` numbers refer to the `PEN` number and the colour of `INK`.

Throughout the program the colour of the text or graphics can be achieved by using the correct number `PEN` according to the colour required. Therefore `PEN 2` would give the colour 'bright white' for the text or graphics that followed. Referring again to line 5 the command `PEN #2,6` would give a 'bright green' for the text or graphics in `WINDOW #2` (the 6 referring to `INK 6,18`).

```
1 REM flash
3 MODE 0
4 DIM c$(7)
5 PEN 0 : INK 0,0 : PEN 1 : INK 1,1 : PEN 2 : INK
2,26 : PEN 3 : INK 3,3 : PEN 4 : INK 4,4 : PEN 5 :
 INK 5,15 : PEN 6 : INK 6,18 : PEN 7 : INK 7,24 :
PEN 8 : INK 8,13
7 BORDER 0 : PAPER 0 : LOCATE 2,6 : PRINT "TEST YO
UR MEMORY" : LOCATE 1,9 : PRINT "REMEMBER THE COLO
URS" : LOCATE 3,12 : PRINT "AS THEY FLASH ON" : LO
CATE 5,15 : PRINT"THE SCREEN" : FOR t = 1 TO 6000
: NEXT t
8 GOSUB 400
10 WINDOW #1,1,20,1,25
12 WINDOW #2,1,10,1,12
14 WINDOW #3,11,20,1,12
16 WINDOW #4,1,10,13,25
18 WINDOW #5,11,20,13,25
30 BORDER 13 : PAPER #1,8 : CLS #1
35 FOR p = 1 TO 10
40 PEN #1,6 : LOCATE #1,7,12 : PRINT #1,"R-E-A-D-Y
" : LOCATE #1,1,16 : PRINT #1,"hit any key to star
t"
42 IF p = 10 THEN 46
45 FOR t = 1 TO 50 : NEXT t : CLS #1 : NEXT p
46 n$ = INKEY$ : IF n$ = "" THEN 46
48 CLS #1
50 a = INT(RND*8) : b = INT(RND*8) :c = INT(RND*8)
 : d = INT(RND*8)
60 PAPER #2,a : CLS #2 : GOSUB 300 : PAPER #2,8 :
CLS #2
62 PAPER #3,b : CLS #3 : GOSUB 300 : PAPER #3,8 :
```

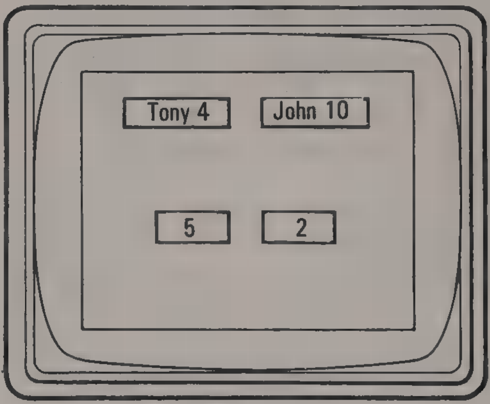
```
CLS #3
66 PAPER #5,d : CLS #5 : GOSUB 300 : PAPER #5,8 :
CLS #5
68 PAPER #4,c : CLS #4 : GOSUB 300 : PAPER #4,8 :
CLS #4
250 PRINT #1,"Possible colours    used were:"
255 PRINT #1,"black" : PRINT #1,"blue" : PRINT #1,
"white" : PRINT #1,"red" : PRINT #1,"purple" : PRI
NT #1,"orange" : PRINT #1,"green" : PRINT #1,"yell
ow"
260 PRINT #1 : PRINT #1,"What was the order"
265 FOR e = 1 TO 4 : INPUT #1,ans$(e) : NEXT e
268 a$ = "" : a$ = a$ + ans$(1) : b$ = "" : b$ = b
$ + c$(a)
270 d$ = "" : d$ = d$ + ans$(2) : e$ = "" : e$ = e
$ + c$(b)
272 f$ = "" : f$ = f$ + ans$(3) : g$ = "" : g$ = g
$ + c$(d)
274 h$ = "" : h$ = h$ + ans$(4) : j$ = "" : j$ = j
$ + c$(c)
276 IF a$ = b$ AND d$ = e$ AND f$ = g$ AND h$ = j$
 THEN GOTO 320
278 PEN #1,3
280 PRINT #1,"*****no*****" : PRINT #1,"order was"
 : PRINT #1,c$(a) : PRINT #1,c$(b) : PRINT #1,c$(d
) : PRINT #1,c$(c)
281 FOR t = 1 TO 5000 : NEXT t
282 GOTO 330
300 FOR t = 1 TO 500 : NEXT t : RETURN
320 CLS #1 : FOR q = 1 TO 12 : LOCATE #1,7,13 : PA
PER #1,INT(RND*8) : PRINT #1,"G-O-O-D" : SOUND 1,3
8,25,6 : FOR t = 1 TO 150 : NEXT t
327 CLS #1 : NEXT q
330 PAPER #1,8 : CLS #1 : LOCATE #1,2,15 : PRINT #
1,"hit a key to start"
332 m$ = INKEY$ : IF m$ = "" THEN 332
335 GOTO 30
400 FOR g = 0 TO 7
405 READ c$(g)
410 NEXT g
415 RETURN
420 DATA black,blue,white,red,purple,orange,green,
yellow
```

SNAP

a game for two players

PARENTS- an exciting but simple program simimlar to the traditional game of SNAP. It will test a child or adult's quickness of eye and reflexes. The very young child will also have practice in matching numbers. Players are asked for their names and then given either the S key or the L key to press down for SNAP! These keys are at opposite ends of the keyboard so confusion should not arise with an opponents hand getting in the way. Points are awarded depending on the value of the SNAP cards. Stop the game by pressing the ESC key.

CHILDREN- SNAP!! You must have all played the game with playing cards. Now try computer SNAP! Test your reflexes and quickness of eye against a friend, mum or dad. You will be asked to type in your names and will then be told to use either key S or key L . Watch the numbers and when two the same appear press your key down. The computer will decide who pressed first. Points are awarded and shown on the screen, which will look like this:-



Things happen when you SNAP correctly.

PROGRAMMING HINT - PAPER

The PAPER refers to the colour of the screen. Line 20 defines ten colours through the PEN and INK command. In order to colour the screen use the command PAPER together with the `PEN` number for the colour `INK` that you require. For instance in line 20, `PEN 7 : INK 7,15` gives orange (colour number 15) so, `PAPER 7` when used in this program would give an orange coloured screen, when the screen has been cleared (`CLS` or `CLG`).

Try to work out the colours of the `BORDER`, `PAPER` and `PEN` in line 205, but remember that the `BORDER` colour is taken straight from the master colour chart, (see User Guide) and does not refer to a `PEN` or `INK` statement.

```
1 REM snap
10 MODE 0
15 GOSUB 200 : CLS
20 PEN 0 : INK 0,0 : PEN 1 : INK 1,6 : PEN 2 : INK
 2,15 : PEN 3 : INK 3,26 : PEN 4 : INK 4,13 : PEN
5 : INK 5,24 : PEN 6 : INK 6,20 : PEN 7 : INK 7,15
 : PEN 8 : INK 8,7 : PEN 9 : INK 9,8
30 BORDER 23 : PAPER 2 : CLS : PEN 3 : PRINT : PRI
NT "Give me your names" : PRINT "(max. of 4 letter
s)" : PRINT
35 PRINT "Player 1" : INPUT p$
37 PRINT "Player 2" : INPUT pp$
40 PRINT : PRINT p$;"you must press key S"
42 PRINT : PRINT pp$;"you must press key L"
44 PRINT : PRINT : PRINT "You will score" : PRINT
"points as you SNAP" : PRINT "up the numbers"
45 PRINT : PRINT "Get Ready"
46 FOR t = 1 TO 8000 : NEXT t
90 p = 0 : pp = 0
95 MODE 0
100 s = 0 : a = INT(RND*6) : b = INT(RND*6)
110 LOCATE 6,13 : PRINT a : LOCATE 11,13 : PRINT b

112 LOCATE 3,2 : PRINT p$;p : LOCATE 11,2 : PRINT
pp$;pp
115 a$ = INKEY$
120 s = s + 1
130 IF a$ = "s" AND a = b THEN LOCATE 6,20 : PRINT
 "snap";p$ : p = p + a + 1 : GOSUB 190 : GOTO 95
132 IF a$ = "l" AND a = b THEN LOCATE 6,20 : PRINT
 "snap";pp$ : pp = pp + a +1 : GOSUB 190 : GOTO 95

135 IF s < 80 THEN 115
140 GOTO 100
190 FOR t = 1 TO 1000 : NEXT t
200 CLS : FOR m = 1 TO 6 : BORDER INT(RND*26)+1 :
```

```
LOCATE 6,13 : PRINT "S-N-A-P" : PAPER INT(RND*9)+1
 : SOUND 1,53,15,6 : FOR t = 1 TO 300 : NEXT t : C
LS : NEXT m
205 BORDER 23 : PAPER 2 : PEN 3 : CLS
210 RETURN
```

MULTIPLICATION

PARENTS- the aim of this program is to give practice in multiplication using numbers between 0 and 20. Speed is an important factor and the children are timed whilst achieving ten correct answers. The program begins by allowing the child a choice of difficulty either:-

a) easy

b) harder

c) very hard

The easy questions use numbers between 0 and 10 e.g. 7 X 8. The harder questions use one number between 0 and 10 and one between 10 and 20 e.g. 16 X 5. The very hard questions use two numbers between 10 and 20 e.g. 12 X 18.

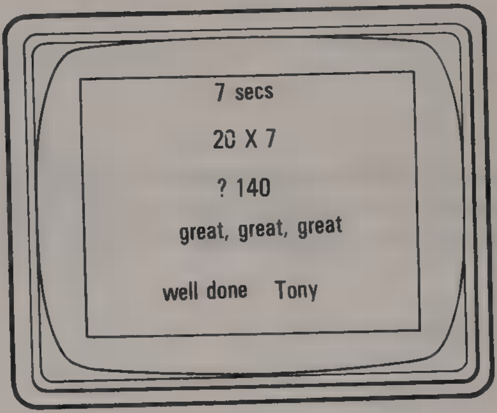
CHILDREN- how quickly can you answer multiplication tables? It is always useful to be able answer them speedily and this program will give you plenty of practice.Test your skill against your friends time too. The computer will first ask you how hard you want the questions:-

> The easy questions, which are choice (a), will give you two numbers between 0 and 10,
>
> for example 7 X 6.
>
> The harder questions, which are choice (b), will give you one number between 0 and 10 and one number between 10 and 20,
>
> for example 13 X 7.
>
> The very hard questions,which are choice (c), will practice your long multiplication by giving you two numbers between 10 and 20,
>
> for example 15 X 18.

You will find it helpful to use a piece of paper for these questions.

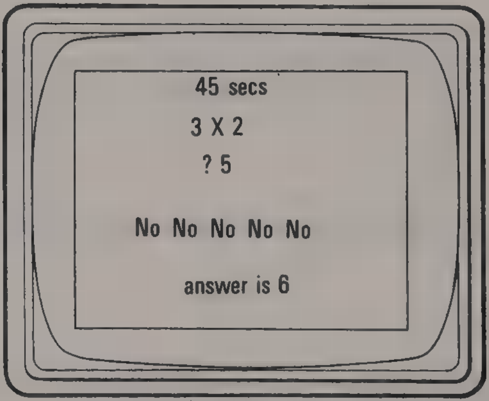
The computer will keep giving you questions until you get 10 correct. It will then tell you how long you took.

Your television set will look something like this:-



```
7 secs

20 X 7

? 140

great, great, great

well done    Tony
```

or



```
45 secs

3 X 2

? 5

No No No No No

answer is 6
```

You must always remember to press ENTER as soon as you have typed your answer into the computer. Don't waste time because every second counts!

PROGRAMMING HINTS - RANDOM NUMBERS

Random numbers are used to generate a variety of situations. In this program to give numbers to multiply. Look at lines 210 to 220. The numbers are picked randomly:-

`a=INT(RND*11)` picks a random whole number between 0 and 10, including 0 or 10

`a=INT(RND*11)+10` picks a random whole number between 0 and 10 and then adds 10 to it.

So the formula `a = INT(RND*b)+c` will pick a random number 'a' where 'c' is the lowest number and 'b' is the highest one, worked out by adding 'b' to 'c' and subtracting one.

Try this program:-

```
    10 a = INT(RND*30)+20

    20 PRINT a

30 GOTO 10
```

Do you have on the screen a column of figures between 20 and 49? I hope so!!

```
1 REM tables
10 MODE 0
50 BORDER 9 : PAPER 0 : INK 0,22
60 CLS : PEN 1 : INK 1,6 : LOCATE 2,4 : PRINT "Wha
t is your name?"
70 LOCATE 2,6 : INPUT name$
80 LOCATE 2,8 : PEN 2 : INK 2,10 : PRINT "Hello ";
name$
90 LOCATE 1,10 : PEN 1 : PRINT "Let's test your
  tables against the  clock?"
100 PRINT : PEN 3 : INK 3,26 : PRINT "You must giv
e the   correct answer to   ten questions."
110 PRINT : PEN 4 : INK 4,1 : PRINT "Hit any key t
o start"
120 a$ = INKEY$ : IF a$ = "" THEN 120
130 CLS : BORDER 9 : PAPER 0 : INK 0,22 : PEN 1 :
INK 1,6 : LOCATE 1,4 : PRINT "How hard do you want
your tables?"
140 PRINT: PRINT : PRINT " 1) easy" : PRINT : PRIN
T " 2) harder" : PRINT : PRINT " 3) very hard"
150 PRINT : PRINT "Type 1, 2 or 3"
160 PRINT : INPUT d
170 IF d < 1 OR d > 3 THEN PRINT "I said 1, 2 or 3
" : FOR t = 1 TO 2000 : NEXT t : GOTO 130
```

```
180 total = 0
190 datum = INT(TIME/300)
200 CLS : BORDER 6 : PAPER 0 : INK 0,0
205 WINDOW #1,10,20,10,1 : ticker = INT((TIME/300)
-datum) : LOCATE 1,1 : PEN #1,7 : INK 1,7,24 : PRI
NT #1,ticker;"secs"
210 IF d = 1 THEN a = INT(RND*11) : b = INT(RND*11
)
215 IF d = 2 THEN a = INT(RND*11)+10 : b = INT(RND
*11)
220 IF d = 3 THEN a = INT(RND*11)+10 : b = INT(RND
*11)+10
240 LOCATE 5,9 : PEN 3 : PRINT a;" X ";b
250 LOCATE 7,11 : INPUT ans
260 IF ans <> a*b THEN 400
270 PEN 6 : INK 6,5 : PRINT : PRINT "great, great,
 great"
275 PRINT : PRINT "      well done"
277 LOCATE 8,17 : PRINT name$
280 FOR g = 1 TO 10 : FOR t = 1 TO 200 : NEXT t :
SOUND 1,40,20,7 : NEXT g
290 total = total + 1 : IF total = 10 THEN GOTO 30
0
295 GOTO 200
300 CLS : CLS #1 : LOCATE 2,6 : PRINT "You took ";
ticker;"secs" : PRINT : PRINT "to get 10 correct."
310 PRINT : PRINT "Do you want 10 more?"
315 INPUT n$ : IF n$ = "y" OR n$ = "yes" OR n$ = "
Y" OR n$ = "YES" THEN 130
320 PRINT : PRINT "Bye for now" : END
400 PRINT : PRINT : FOR c = 7 TO 3 STEP -1
410 SOUND 1,1911,40,c
420 PEN 5 : INK 5,18 : PRINT "No  "; : NEXT c
430 PRINT : PRINT "answer is ";a*b : FOR t = 1 TO
3000 : NEXT t : GOTO 200
```

MORE OR LESS

PARENTS- this program will help the understanding of the meaning of "more than" and "less than" using the symbols ">" and "<" respectively, and allows for the use of four groups of numbers depending on the difficulty required.

CHILDREN- do you know the meaning of the symbols ">" and "<"? If not, now is your chance to learn! The program first asks you to select numbers

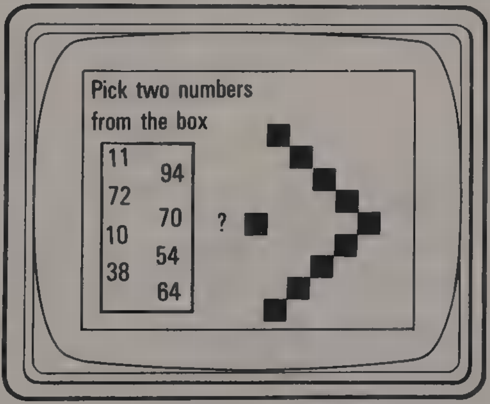
a) under 25

b) under 50

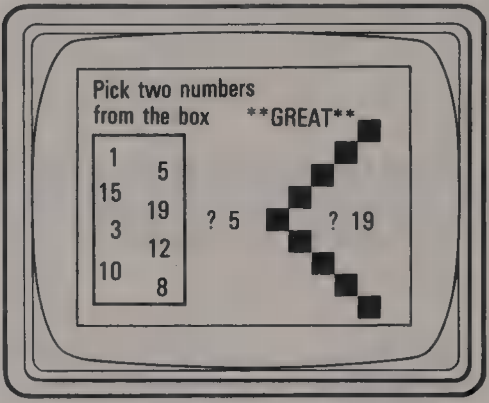
c) under 75

d) under 100

by pressing either a, b, c or d. The program then presents you with eight numbers and you must type in two of these to make the statement and sign true. Press **ENTER** after each number has been selected. Your screen will look like this:-



```
Pick two numbers
from the box
 11
      94
 72
      70    ?
 10
      54
 38
      64
```



```
Pick two numbers
from the box     **GREAT**
1
   5
15
   19   ? 5        ? 19
3
   12
10
   8
```

Success will bring music and a random flashing of border colours.

PROGRAMMING HINT - TIME LOOP `FOR...NEXT`

Throughout all the programs, you will see statements which cause a pause in the execution of the program. Look at line 408:-

```
408 FOR t = 1 TO 3500 : NEXT t
```

All that happens is that the computer counts from 1 to 3500. Even a computer can't do that immediately, so there is a pause. The `FOR` starts the computer counting at 1. `NEXT t` makes it go back again and again until it reaches 3500. Because the `NEXT t` sends the computer back to the `FOR`, we call this a loop; so line 408 is a `FOR...NEXT` loop. The pause can be lengthened by increasing the number or, conversely, shortened by decreasing the number.

Try this:-

```
10 PRINT "London"

20 FOR t = 1 TO 2000 : NEXT t

30 GOTO 10
```

Stop the program and alter line 20 to read:-

```
20 FOR t = 1 TO 500 : NEXT t
```

Observe the result.

```
10 REM less-more
30 goes = 0
40 CLS
50 BORDER 0
60 PAPER 3
70 PEN 1 : INK 1,13
80 LOCATE 4,5 : PRINT "LESS THAN OR MORE THAN"
90 LOCATE 4,8 : PRINT "Do you want numbers:"
92 LOCATE 6,10 : PRINT "a) under 25"
94 LOCATE 6,12 : PRINT "b) under 50"
96 LOCATE 6,14 : PRINT "c) under 75"
98 LOCATE 6,16 : PRINT "d) under 100"
100 LOCATE 4,20 : PRINT "Either a,b,c or d and the
n press ENTER"
102 INPUT x$
104 IF x$ = "a" THEN z = 25
105 IF x$ = "b" THEN z = 50
106 IF x$ = "c" THEN z = 75
107 IF x$ = "d" THEN z = 100
108 BORDER 0 : PAPER 3 : PEN 1 : INK 1,13 : CLS
110 c = INT(RND*z) : d = INT(RND*z)
120 e = INT(RND*z) : f = INT(RND*z)
130 g = INT(RND*z) : h = INT(RND*z)
140 j = INT(RND*z) : k = INT(RND*z)
150 GOSUB 500
155 LOCATE 2,2 : PRINT "Pick two numbers"
157 LOCATE 2,3 : PRINT "from the box"
160 y = INT(RND*2)
170 IF y = 0 THEN GOSUB 550 : GOTO 200
180 IF y = 1 THEN GOSUB 620 : GOTO 200
200 LOCATE 5,5 : PRINT c
210 LOCATE 9,6 : PRINT d
220 LOCATE 6,8 : PRINT e
230 LOCATE 8,11 : PRINT f
240 LOCATE 6,14 : PRINT g
250 LOCATE 8,17 : PRINT h
260 LOCATE 7,19 : PRINT j
270 LOCATE 6,22 : PRINT k
350 LOCATE 20,14 : INPUT p
360 LOCATE 35,14 : INPUT s
380 IF y = 0 AND p < s THEN GOSUB 700 : GOTO 720
390 IF y = 1 AND p > s THEN GOSUB 700 : GOTO 740
400 LOCATE 20,3 : PRINT "No,try again"
405 LOCATE 15,22
406 IF y = 0 AND p > s THEN PRINT p;"is greater th
an";s
407 IF y = 1 AND p < s THEN PRINT p;"is less than"
;s
408 FOR t = 1 TO 3500 : NEXT t
410 GOTO 108
```

```
500 PLOT 50,20
510 DRAW 50,350 : DRAW 200,350 : DRAW 200,20 : DRA
W 50,20
520 RETURN
550 FOR a = 0 TO 4 : LOCATE 30-a,10+a : PRINT CHR$
(143)
555 LOCATE 30-a,18-a : PRINT CHR$(143)
560 NEXT a : RETURN
620 FOR a = 0 TO 4 : LOCATE 28+a,10+a : PRINT CHR$
(143)
630 LOCATE 28+a,18-a : PRINT CHR$(143)
640 NEXT a : RETURN
700 FOR u = 1 TO 30 : v = INT(RND*26) : BORDER v
710 LOCATE 23,5 : PRINT "** GREAT **"
715 SOUND 1,400+v,20,6 : NEXT u : RETURN
720 LOCATE 15,23 : PRINT "Yes";p;"is less than";s
: GOTO 750
740 LOCATE 15,23 : PRINT "Yes";p;"is greater than"
;s : GOTO 750
750 FOR t = 1 TO 3500 : NEXT t : goes = goes + 1
760 IF goes < 10 THEN 108
770 CLS : LOCATE 7,10 : PRINT "B Y E   F O R   N O
 W" : END
```

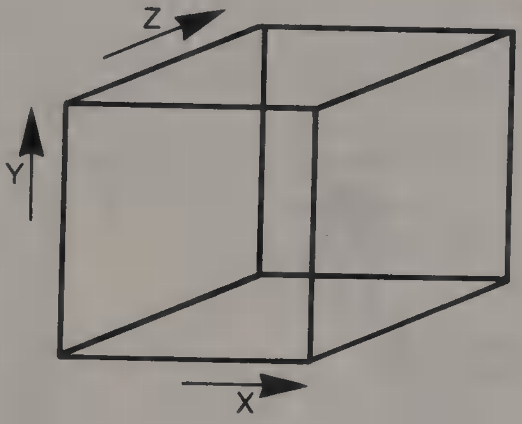
INVASION OF THE OCTOPOIDS

Setting The Scene.

The time is the 23rd century. There is a lot of interplanetary activity. The planet Earth is under constant threat from aliens (octopoids) from other planets within the galaxy. Security spaceships are in constant patrol around Earth. One of these patrols has been shot down by a ship from the planet Zercos. War once again is a major threat. You are in command of a patrol ship armed with fire bombs, which on impact destroy the enemy. Can you survive your patrol duty and help rid Earth of these alien octopoids which are coming in swarms from Zercos? Death is always imminent from the deadly laser beams, volcanic eruptions causing thousands of meteorites, the octopoids, or by a direct collision with Zercos.

Instructions.

To survive your patrol duty you need to make five direct hits on the octopoids. Movement around the galaxy is through three coordinates:-



Remember that for each movement through the galaxy, you must input three numbers between 1 and 10. These are your three coordinates and must be entered in the order X, Y, Z as shown in the diagram. After each number has been typed in, press ENTER .

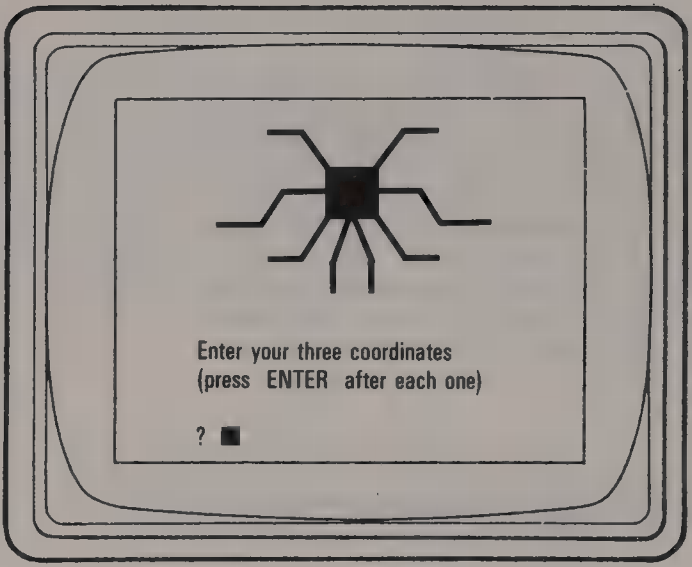
For example:-

5 ENTER

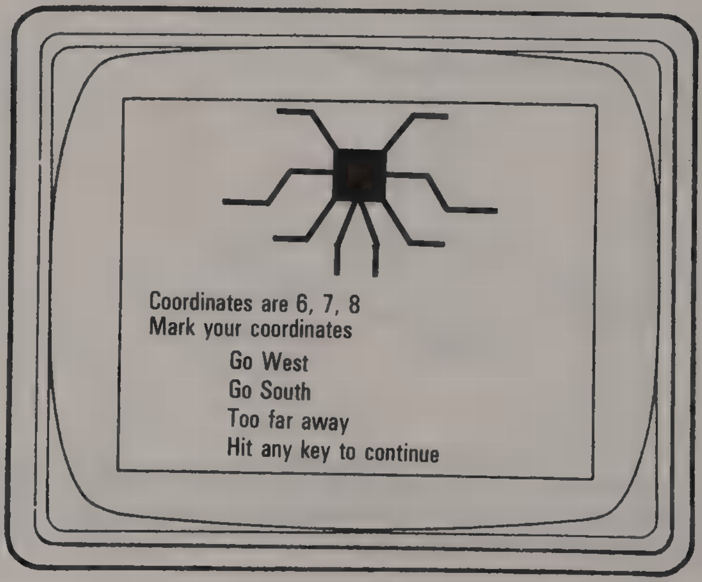
5 ENTER

5 ENTER

You should get this:-



```
Enter your three coordinates
(press  ENTER  after each one)

? ■
```



```
Coordinates are 6, 7, 8
Mark your coordinates
            Go West
            Go South
            Too far away
            Hit any key to continue
```

The program will direct you through the galaxy but you must keep a record to help you manoeuvre your patrol boat.

For example:-

First Input	Instruction From Computer (Direction)	Second Input	Direction	Third Input	Direction	
X=5	GO EAST	8	GOOD	8	GOOD	H
Y=5	GO NORTH	8	GO SOUTH	6	GOOD	I
Z=5	TOO FAR AWAY	3	FURTHER AWAY	4	GOOD	T

TYPING TIP

The variable cl (lower case c and lower case l) and the variable li (lower case l and lower case i) are both used between lines 905 and 915. Do not confuse these with the numerical figure 1.

PROGRAMMING HINT - `IF....THEN Statements`

You will find this and other similar statements throughout all programs but in particular in this one between lines 190 and 430. The `IF` statement is used to compare two expressions where a simple `YES` or `NO` answer is given. In line 190, `IF` the value of 'X' equals the value of 'a' and the value of 'Y' equals the value of 'b' and the value of 'Z' equals the value of 'c' `THEN GOTO` line 700. IF all these values give a positive `YES` answer, then the program will go to line 700 (i.e. the line number after the `THEN`). `IF` any of the statement is untrue giving a `NO` answer then the statement is ignored and the program passes to the next line. Try to work out in a similar way what happens between lines 445 and 472. In this statement the BASIC word `GOTO` may be omitted.

```
1 REM octopoids
10 MODE 1
20 BORDER 0 : PAPER 0 : INK 0,0 : CLS : GOSUB 600
30 PEN 1 : INK 1,26 : LOCATE 8,16 : PRINT "HERE CO
ME THE OCTOPOIDS"
40 LOCATE 13,19 : PEN 3 : INK 3,21 : PRINT "ADJ No
ble 1984"
50 FOR t = 1 TO 3000 : NEXT t
60 CLS : LOCATE 1,1 : PRINT "The time is the 23rd
Century. The Planet Earth is being invaded by OCTO
POIDS    from the Planet Zercos. You are in       c
ommand of a patrol ship armed with firebombs. It i
s your mission to destroy"
65 PRINT "FIVE OCTOPOIDS and so save your Planet.
You move around the galaxy using        coordinate
s. Input three coordinates and you will be told wh
ich direction to    move in. Each coordinate will
be a      number between 1 and 10."
68 PRINT "You need the correct combination of the
three coordinates to destroy an Octopoid"
70 PRINT "Beware of sudden death. Good luck.
75 PEN 1 : INK 1,6 : PRINT : PRINT " Hit any key t
o continue"
77 a$ = INKEY$ : IF a$ = "" THEN 77
80 p = 0
90 e = INT(RND*10)+1
91 f = INT(RND*10)+1
92 g = INT(RND*10)+1
95 CLS
97 IF p = 5 THEN 900
98 BORDER 10 : PAPER 0 : INK 0,0 : GOSUB 600
100 PEN 1 : INK 1,24 : LOCATE 6,17 : PRINT "Enter
your three coordinates"
102 LOCATE 6,18 : PRINT "(press ENTER after each o
ne)"
104 LOCATE 6,20 : INPUT x
106 LOCATE 6,21 : INPUT y
108 LOCATE 6,22 : INPUT z
140 CLS : GOSUB 600
150 PEN 1 : INK 1,24 : LOCATE 6,17 : PRINT "Coordi
nates are ";x;",";y",";z
155 LOCATE 6,19 : PRINT "Mark your coordinates"

160 IF x = e AND y = f AND z = g THEN 950
180 a = INT(RND*10)+1 : b = INT(RND*10)+1
186 c = INT(RND*10)+1 : d = INT(RND*10)+1
190 IF x = a AND y = b AND z = c THEN 700
200 IF x = a AND y = b AND z = d THEN 700
210 IF x = a AND y = d AND z = c THEN 700
220 IF x = a AND y = c AND z = d THEN 700
```

```
230 IF x = d AND y = b AND z = a THEN 700
240 IF x = d AND y = b AND z = c THEN 700
250 IF x = d AND y = a AND z = c THEN 700
260 IF x = c AND y = a AND z = d THEN 700
270 IF x = c AND y = d AND z = a THEN 700
280 IF x = c AND y = b AND z = a THEN 700
290 IF x = c AND y = a AND z = b THEN 700
300 IF x = b AND y = a AND z = c THEN 750
310 IF x = b AND y = b AND z = c THEN 750
320 IF x = b AND y = c AND z = c THEN 750
330 IF x = b AND y = d AND z = c THEN 750
340 IF x = d AND y = a AND z = b THEN 750
350 IF x = d AND y = a AND z = a THEN 750
360 IF x = b AND y = b AND z = d THEN 750
370 IF x = b AND y = d AND z = a THEN 750
380 IF x = a AND y = d AND z = b THEN 750
390 IF x = d AND y = d AND z = d THEN 750
400 IF x = c AND y = d AND z = b THEN 750
410 IF x = c AND y = d AND z = c THEN 750
420 IF x < 4 AND y = d AND z = a THEN 850
430 IF x = a AND y = a AND z > 7 THEN 800
445 IF x = e THEN LOCATE 6,21 : PEN 3 : INK 3,6 :
PRINT "Good"
450 IF x > e THEN LOCATE 6,21 : PEN 3 : INK 3,6 :
PRINT "Go West"
452 IF x < e THEN LOCATE 6,21 : PEN 3 : INK 3,6 :
PRINT "Go East"
455 IF y = f THEN LOCATE 6,22 : PRINT "Good"
460 IF y > f THEN LOCATE 6,22 : PRINT "Go South"
462 IF y < f THEN LOCATE 6,22 : PRINT "Go North"
465 IF z = g THEN LOCATE 6,23 : PRINT "Good"
470 IF z > g THEN LOCATE 6,23 : PRINT "Too far awa
y"
472 IF z < g THEN LOCATE 6,23 : PRINT "Further awa
y"
480 LOCATE 4,25 : PEN 1 : INK 1,24 : PRINT "Hit an
y key to continue"
485 a$ = INKEY$ : IF a$ = "" THEN 485
490 GOTO 95
600 PEN 2 : INK 2,6,2 : LOCATE 14,3 : PRINT CHR$(2
08)CHR$(208)CHR$(208)CHR$(205);"      ";CHR$(204)C
HR$(208)CHR$(208)CHR$(208)
605 LOCATE 18,4 : PRINT CHR$(205);"    ";CHR$(204)
610 FOR u = 0 TO 3 : FOR v = 0 TO 3 : LOCATE 19+u,
5+v : PRINT CHR$(143) : NEXT v : NEXT u
615 LOCATE 16,7 : PRINT CHR$(204)CHR$(208)CHR$(208
) : LOCATE 23,7 : PRINT CHR$(208)CHR$(208)CHR$(205
)
620 LOCATE 13,8 : PRINT CHR$(210)CHR$(210)CHR$(204
) : LOCATE 26,8 : PRINT CHR$(205)CHR$(210)CHR$(210)
```

```
625 LOCATE 18,9 : PRINT CHR$(204)CHR$(32)CHR$(204)
CHR$(205)CHR$(32)CHR$(205)
630 LOCATE 17,10: PRINT CHR$(204)CHR$(32)CHR$(204)
CHR$(32)CHR$(32)CHR$(205)CHR$(32)CHR$(205)
635 LOCATE 14,11 : PRINT CHR$(210)CHR$(210)CHR$(20
4)CHR$(32)CHR$(32)CHR$(211)CHR$(32)CHR$(32)CHR$(20
9)CHR$(32)CHR$(32)CHR$(205)CHR$(210)CHR$(210)
640 LOCATE 19,12 : PRINT CHR$(211)CHR$(32)CHR$(32)
CHR$(209)
645 SOUND 1,47,20,6 : RETURN
700 CLS : BORDER 0 : PAPER 0 : INK 0,0 : PEN 1 : I
NK 1,26 : LOCATE 6,1 : PRINT "H I T  B Y  M E T E
O R I T E"
705 LOCATE 9,3 : PRINT "B A C K  T O  S T A R T"

710 FOR k = 1 TO 50 : LOCATE INT(RND*40)+1,INT(RND
*20)+5 : PEN 2 : INK 2,INT(RND*26) : PRINT "*" : S
OUND 1,INT(RND*1000),10,6 : FOR t = 1 TO 30 : NEXT
 t : NEXT k
720 GOTO 80
750 CLS : BORDER 0 : PAPER 0 : INK 0,0 : PEN 1 : I
NK 1,6,12 : FOR h = 200 TO 400 STEP 20 : ORIGIN 0,
0 : DRAW 600,h : NEXT h
760 FOR l = 400 TO 600 STEP 20 : ORIGIN 0,0 : DRAW
 l,400 : NEXT l
770 LOCATE 1,1 : PRINT "DEATH" : PRINT TAB(5);"BY"
 : PRINT TAB(6);"LASER" : PRINT TAB(10);"BEAM"
780 LOCATE 23,25 : PRINT "BACK TO START"
790 FOR m = 0 TO 5 : FOR n = 2 TO 7 : SOUND 1,253,
30,n : NEXT n : NEXT m : GOTO 80
800 CLS : BORDER 0 : PAPER 0 : INK 0,0 : FOR r = 1
 TO 100 : ORIGIN 0,0 : PEN 1 : INK 1,18,26 : DRAW
INT(RND*400)+200,INT(RND*400) : NEXT r
810 LOCATE 1,4 : PEN 2 : INK 2,10 : PRINT "S-P-L-A
-T" : LOCATE 1,6 : PRINT "Z-E-R-C-O-S  H-I-T" : LO
CATE 1,10 : PRINT "BACK TO START" : GOSUB 1000
820 GOTO 80
850 CLS : BORDER 10 : PAPER 0 : INK 0,10 : GOSUB 6
00
860 LOCATE 2,20 : PEN 1 : INK 1,0 : PRINT "DEATH**
**DEATH****DEATH****DEATH****" : LOCATE 1,22 : PRI
NT "D-E-A-T-H***F-R-O-M***O-C-T-O-P-O-I-D-S" : LOC
ATE 13,24 : PRINT "BACK TO THE START"
870 GOSUB 1000 : GOTO 80
900 CLS : BORDER 0 : PAPER 0 : INK 0,0
905 FOR cl = 1 TO 2 : PEN 1 : INK 1,7,13
908 LOCATE 2,2 : PEN 2 : INK 2,26 : PRINT "Good, w
ell done five bombs on target" : PRINT "Type RUN t
o play again"
910 ORIGIN 0,0 : ab = INT(RND*100)+100 : FOR circl
```

```
e = 1 TO 360 : DEG : PLOT 320,200: PLOT 320+ab*COS
(circle),200+ab*SIN(circle) : NEXT circle
915 NEXT cl : FOR li = 1 TO 80 : ORIGIN 0,0 : PLOT
 320,200 : DRAW INT(RND*600),INT(RND*400) : NEXT l
i : END
950 CLS : BORDER 13 : PAPER 0 : INK 0,13 : GOSUB 6
00 : LOCATE 10,20 : PEN 3 : INK 3,0 : PRINT "O-C-T
-O-P-O-I-D   H-I-T"
960 LOCATE 18,22 : PRINT "G*O*O*D" : GOSUB 1000
970 p = p+1 : GOTO 90
1000 FOR s = 1 TO 14 : FOR t = 1 TO 500 : NEXT t :
 SOUND 1,84,20,5 : NEXT s : RETURN
```

COUNT

PARENTS- this is a program for the very young child, primarily to help with early counting. The very clear graphics can be used to reinforce the learning of the colours. As the children using this program will be very young, it is important that they are given a lot of patient help and guidance. The program will select either:-

moon buggies

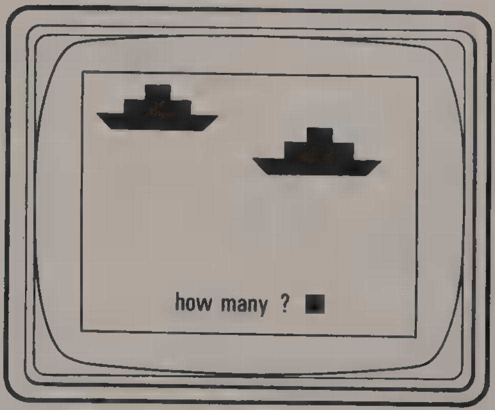
rockets

ships

or cars

Up to five of these then appear, randomly on the screen. The background colour of the screen and the colour of each group of objects will vary with each new screen. The child has to count the number of objects on the screen, type the number in figures and press the ENTER key. Failure to answer correctly results in the correct number being shown. The program continues and can only be stopped by pressing the ESC key.

CHILDREN- it is fun to count with your computer. Have a go. Your screen may look like this:-



PROGRAMMING HINT - PRINT TAB() CLS

In this program the `PRINT TAB`(figure) is used on several occasions to print graphics characters at a certain position on the line. It can also be used to print text.

`PRINT TAB(5)` will move the cursor 5 spaces along the line whereas `PRINT` without the `TAB` would start at the beginning of the line.

Try this program. You will see that line 10 clears (`CLS`) the screen:-

```
10 CLS

20 PRINT "London"

30 PRINT TAB(5)"London"

40 PRINT TAB(10)"London"
```

On many occasions in this program listing of COUNT, the `TAB` function had a random number inserted in the brackets, which positioned the object on the line. Lines 225 to 245 is one such occasion.

Try this program:-

```
10 CLS

20 a = INT(RND*14)+1

30 PRINT TAB(a)"Hello"

40 FOR t = 1 TO 500 : NEXT t

50 GOTO 10
```

```
1 REM count
10 a$ = CHR$(143)+CHR$(143) : b$ = CHR$(143)+CHR$(
143)+CHR$(143)+CHR$(143)
25 PEN 0 : INK 0,26 : PEN 1 : INK 1, 6 : PEN 2 : I
NK 2,0
30 BORDER 0 : PAPER 2 : PEN 0 : CLS
35 FOR r = 0 TO 27 : LOCATE 7+r,3 : PRINT CHR$(207
) : LOCATE 7+r,9 : PRINT CHR$(207): NEXT r
40 PEN 1 : LOCATE 15,6 : PRINT "C  O  U  N  T"
42 LOCATE 3,16 : PRINT "You must count the objects
 on the" : PRINT "screen, pressing ENTER after you
r number"
```

```
45 FOR t = 1 TO 5000 : NEXT t
50 a = INT(RND*5)+1
60 b = INT(RND*4)+1
70 ON b GOTO 100,200,300,400
100 PEN 0 : INK 0,10 : PEN 1 : INK 1,6 : PEN 2 : I
NK 2,26 : PEN 3 : INK 3,24
110 BORDER 0 : PAPER 0 : PEN INT(RND*3)+1
112 CLS
120 FOR c = 1 TO a
125 d = INT(RND*28)+3
127 PRINT
130 PRINT TAB(d);a$
132 PRINT TAB(d-1);b$
134 PRINT TAB(d-3);CHR$(213);b$;b$;CHR$(143)CHR$(2
12)
135 GOSUB 590
136 NEXT c
150 GOTO 500
200 PEN 0 : INK 0,0 : PEN 1 : INK 1,7 : PEN 2 : IN
K 2,24 : PEN 3 : INK 3,18
210 BORDER 0 : PAPER 0 : PEN INT(RND*3)+1
212 CLS
220 FOR c = 1 TO a
225 d = INT(RND*34)+2
230 PRINT TAB(d);CHR$(214)CHR$(215)
235 PRINT TAB(d);a$
240 PRINT TAB(d);a$
245 PRINT TAB(d-1);CHR$(214);a$;CHR$(215)
247 GOSUB 590
250 NEXT c
280 GOTO 500
300 PEN 0 : INK 0,13 : PEN 1 : INK 1,7 : PEN 2 : I
NK 2,9 : PEN 3 : INK 3,11
310 BORDER 15 : PAPER 0 : PEN INT(RND*3)+1
312 CLS
320 FOR c = 1 TO a
325 d = INT(RND*24)+6
335 PRINT TAB(d);CHR$(214)CHR$(211)CHR$(32)CHR$(14
3)CHR$(32)CHR$(209)
337 PRINT TAB(d+1);CHR$(211)CHR$(214)CHR$(143)CHR$
(215)CHR$(209)
339 PRINT TAB(d+1);b$;CHR$(143)CHR$(215)
341 PRINT TAB(d+1);a$;b$
343 PRINT TAB(d+1);CHR$(138)CHR$(133)CHR$(32)CHR$(
32)CHR$(138)CHR$(133)
344 GOSUB 590
345 NEXT c
350 LOCATE 1,21 : PRINT "how"
355 PRINT "many"
360 INPUT ans
```

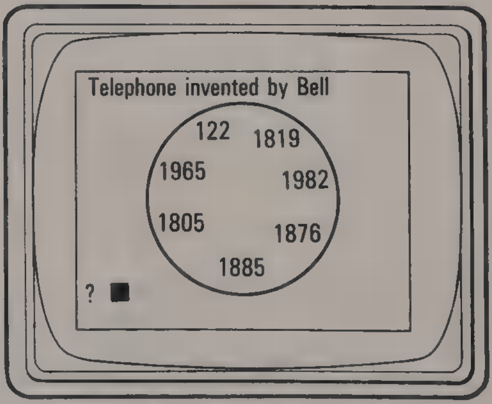
```
365 GOTO 510
400 PEN 0 : INK 0,0 : PEN 1 : INK 1,7 : PEN 2 : IN
K 2,24 : PEN 3 : INK 3,18
410 BORDER 0 : PAPER 0 : PEN INT(RND*3)+1
412 CLS
420 FOR c = 1 TO a
425 d = INT(RND*32)+1
430 PRINT
435 PRINT TAB(d);CHR$(214);b$
440 PRINT TAB(d);a$;b$;CHR$(143)
445 PRINT TAB(d+1);CHR$(207)CHR$(32)CHR$(32)CHR$(3
2)CHR$(207)
447 GOSUB 590
450 NEXT c
500 LOCATE 10,23 : PRINT "how many "; : INPUT ans

510 IF ans = a THEN 550
520 PRINT "no........answer is ";a
530 FOR t = 1 TO 3000 : NEXT t : GOTO 50
550 FOR p = 0 TO 35 STEP 5
555 PRINT TAB(1+p);"good ";: SOUND 1,3034,20,6 : G
OSUB 580
560 NEXT p : GOTO 50
580 FOR t = 1 TO 250 : NEXT t : RETURN
590 SOUND 1,36,20,7 : FOR t = 1 TO 250 : NEXT t :
RETURN
```

DATES - GENERAL HISTORICAL KNOWLEDGE

PARENTS- this is a program to test the important dates in history since the Birth of Christ.

CHILDREN- do you know when the Romans conquered Britain or the year Prince Harry was born? Well, now is your chance to brush up on your knowledge of the important dates in history! Seven dates will appear in a circle, one of these being the answer to the historical question appearing at the top of your screen. You must find this date before you proceed to the next question.

Your screen will look like this:-



```
Telephone invented by Bell
          122  1819
    1965            1982
    1805            1876
            1885
?
```

The program will allow twenty correct answers but you may stop it at any time by pressing the red ESCAPE key.

TYPING TIPS

Make sure that in line 120 the two `PRINT` statements with spaces have 6 and 5 spaces respectively. If you find extra long spaces between the `DATA` words, do not alter these as words may become split on the screen. This is due to the length of the line. Type these statements as you see them.

PROGRAMMING HINT - `INPUT ans` or `INPUT ans$`

The `INPUT` statement allows you to enter information through the keyboard, which will then be stored in your computer's memory. Hence line 110 in this program, when executed, will wait for an `INPUT`, which happens to be the date of the historical statement. With the `INPUT` is a letter(s) which is used as a variable to store the information the computer receives. If words are being stored, a string variable (ans$) is needed, whereas if numbers are being stored, a string variable is not needed (ans).

Try this program:-

```
10 PRINT  "What is your name?"

20 INPUT name$

30 PRINT "How old are you?"

40 INPUT age
```

Can you see the difference?

```
1 REM dates
10 DIM e$(79) : DIM d(79)
15 w$ = CHR$(32)+CHR$(32)+CHR$(32)+CHR$(32)+CHR$(3
2)
16 CLS : BORDER 24 : PAPER 0 : INK 0,24 : PEN 1 :
INK 1,7 : LOCATE 6,8 : PRINT "TEST YOUR KNOWLEDGE
OF THE" : LOCATE 5,11 : PRINT "MORE COMMON DATES I
N HISTORY" : LOCATE 7,14 : PRINT "TWENTY CORRECT T
O FINISH"
17 GOSUB 300 : GOSUB 310 : FOR t = 1 TO 2000 : NEX
T t
20 FOR a = 0 TO 79 : READ e$(a) : NEXT a
30 FOR b = 0 TO 79 : READ d(b) : NEXT b
60 CLS : BORDER 3 : PAPER 0 : INK 0,0 : PEN 1 : IN
K 1,15 : PEN 2 : INK 2,7 : PEN 3 : INK 3,20 : corr
```

```
ect = 0
62 GOSUB 200
65 c = INT(RND*79) : m = INT(RND*79) : g = INT(RND
*79) : h = INT(RND*79) : j = INT(RND*79) : k = INT
(RND*79) : l = INT(RND*79) : n = INT(RND*79)
70 LOCATE 1,3 : PEN 1 : PRINT e$(c)
80 p = INT(RND*7)+1
85 ON p GOSUB 86,87,88,89,90,91,92 : GOTO 100
86 m = c : RETURN
87 g = c : RETURN
88 h = c : RETURN
89 j = c : RETURN
90 k = c : RETURN
91 l = c : RETURN
92 n = c : RETURN
100 GOSUB 150
110 LOCATE 1,20 : PEN 1 : INPUT ans
115 IF ans <> d(c) THEN 250
120 PEN 1 : PRINT "Great" : GOSUB 310 : FOR t = 1
TO 3000 : NEXT t : LOCATE 1,20 : PRINT "       " :
LOCATE 1,21 : PRINT "      " : GOSUB 170 : LOCATE 1
,3 : PRINT STRING$(60," ")
130 correct = correct + 1 : IF correct = 20 GOTO 1
40 ELSE 65
140 CLS : BORDER 10 : PAPER 0 : INK 0,10 : PEN 1 :
 INK 1,6 : LOCATE 2,6 : PRINT "20 dates correct"
145 LOCATE 2,10 : PRINT "Do you want another 20? (
y or n)" : LOCATE 2,12 : INPUT fin$ : IF fin$ = "y
" GOTO 60 ELSE PRINT "Bye" : END
150 PEN 3 : LOCATE 16,7 : PRINT d(m) : LOCATE 21,9
 : PRINT d(g) : LOCATE 14,11 :  PRINT D(h) : LOCAT
E 20,12 : PRINT d(j) : LOCATE 17,14 : PRINT d(k)
160 LOCATE 19,17 : PRINT d(l) : LOCATE 20,19 : PRI
NT d(n) : RETURN
170 LOCATE 16,7 : PRINT w$; : LOCATE 21,9 : PRINT
w$ : LOCATE 14,11 :  PRINT w$ : LOCATE 20,12 : PRI
NT w$ : LOCATE 17,14 : PRINT w$; : LOCATE 19,17 :
PRINT w$ : LOCATE 20,19 : PRINT w$ : RETURN
200 FOR f = 1 TO 360 : DEG : PLOT 320,200,2 : PLOT
 320+130*COS(f),200+130*SIN(f),2 : NEXT f : RETURN
250 PEN 3 : LOCATE 1,24 : PRINT "Sorry, try again"
 : GOSUB 300 : FOR t = 1 TO 3000 : NEXT t
260 LOCATE 1,24 : PRINT w$;w$;w$;w$
280 LOCATE 1,20 : PRINT "       " : GOTO 110
300 FOR s = 1 TO 3 : SOUND 1,1012,50,6 : SOUND 1,2
53,50,4 : NEXT s : RETURN
310 FOR ss = 1 TO 3 : SOUND 1,127,50,6 : SOUND 1,6
3,50,4 : NEXT ss : RETURN
510 DATA Roman conquest of Britain,Vesuvius erupts
```

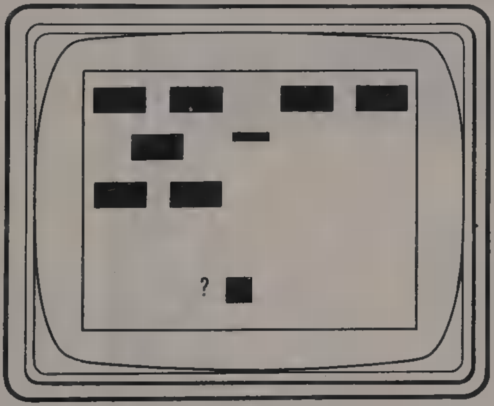
```
 destroying Pompeii,Building of Hadrians Wall,Roma
ns leave Britain,Magna Carta sealed by King John
520 DATA First English Parliament,The Black Death
sweeps through Europe,The first printing press in
England,Columbus discovers America,Magellan embark
s around the world
530 DATA Dissolution of the monasteries,Drake emba
rks on world voyage,Drake defeats the Spanish Arma
da,Guy Fawkes tries to blow up Parliament,Great Pl
ague of London,Great Fire of London
540 DATA England and Scotland unite,Start of Indus
trial Revolution,Captain Cook discovers New South
Wales, American War of Independance,Beginning of t
he French Revolution
550 DATA Napoleonic Wars begin,Napoleon becomes Em
peror of France,Battle of Trafalgar,Battle of Wate
rloo,Abolition of slavery,Penny Post introduced in
 Britain,Crimean War begins,Indian Mutiny,American
 Civil War
560 DATA Slavery abolished in USA,Suez Canal opene
d,Boer War,Wright Brothers successful air flight,P
eary reaches the North Pole,Amundsen reaches South
 Pole
570 DATA Sinking of the Titanic,World War 1 begins
,End of World War 1,General Strike in Britain,Worl
d War 2 begins,Dunkirk evacuated,Battle of Britain
,End of World War 2
580 DATA United Nations formed,Mount Everest conqu
ered,Russia launches first space satellite,First p
ictures of the far side of Moon,First space flight
 by Yuri Gagarin
590 DATA Assassination of President Kennedy,Winsto
n Churchill dies,First Moon landing by Neil Armstr
ong,
600 DATA American space shuttle launched,Birth of
Queen Victoria.Reign of Queen Victoria,Birth or Qu
een Elizabeth 2nd,Coronation of Queen Elizabeth 2n
d
605 DATA Discovery of the jet engine by Whittle,Di
scovery of gas lighting by Murdock
610 DATA Discovery of the gramophone by Edison,Hov
ercraft invented by Cockerell,Steam locomotive inv
ented by Trevithick,Motor car invented by Carl Ben
z
620 DATA Nylon invented by Carothers,Parachute inv
ented by Blanchard,Penicillin discovered by Flemin
g,Radar invented by Watson-Watt,Radium discovered
by the Curies
630 DATA Davy safety lamp for miners invented,Tele
phone invented by Bell,Television invented by Bair
```

```
d,First typewriter,Invention of vacination,Inventi
on of the wireless by Marconi
640 DATA X-rays discovered by Roentgen,Argentina i
nvades the Falkland Islands,IRA attempts to blow u
p British Cabinet,Prince William 2nd heir to the t
hrone   born
650 DATA Prince Henry(Harry) heir to the throne  b
orn
655 DATA First woman Prime Minister in Britain
660 DATA 43,79,122,407,1215,1216,1348,1476,1492,15
19,1536,1577,1588,1605,1665,1666,1707,1760,1770,17
75
670 DATA 1789,1796,1804,1805,1815,1833,1840,1854,1
857,1861,1863,1869,1899,1903,1909,1911,1912,1914,1
918,1926,1939,1940,1940,1945,1945,1953,1957
680 DATA 1959,1961,1963,1965,1969,1981,1819,1837,1
901,1926,1953,1930,1792,1877,1955,1803,1885,1938,1
785,1929,1935
690 DATA 1898,1816,1876,1926,1868,1796,1895,1895,1
982 ,1984,1982,1984,1977
```

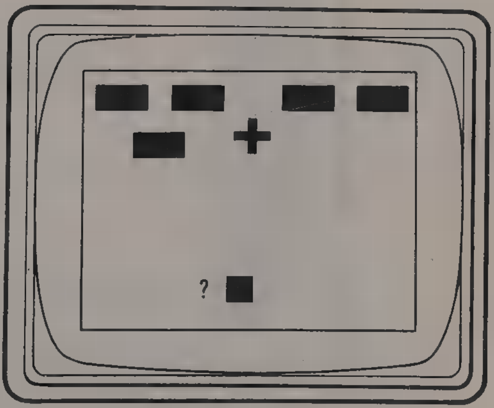
VISUAL ADDITION AND SUBTRACTION

VIS-SUB VIS-ADD

PARENTS- here are two programs to help the young child practice simple addition and subtraction by visually showing the numbers to add or subtract. The screen pictures will look like this:-



or



After the answer has been typed in the ENTER key must be pressed. Appropriate music is then played and if the answer is incorrect the correct one is given.

As the children who are using these programs will be very young, they will need a lot of encouragement, help and guidance at first, wilst they gain confidence in their ability. They should, however, be encouraged to work independently as soon as possible.

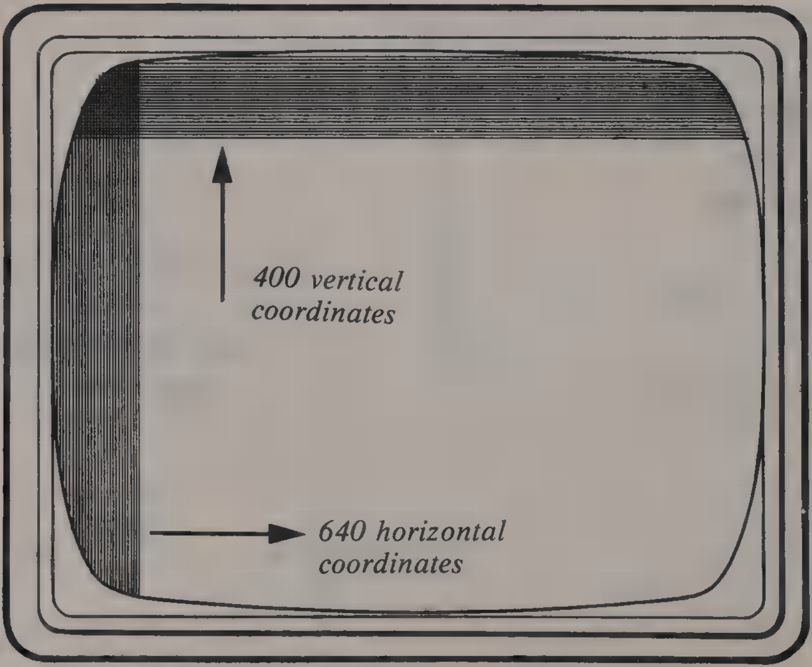
CHILDREN - look carefully at the television. Here are some sums for you to try. How many can you get right?

PROGRAMMING HINT - `PLOT` `DRAW`

These two commands have been extensively used throughout this book. `PLOT` followed by the x and y coordinate will plot a pixel at that point. `DRAW` followed by the x and y coordinate will draw a line on the screen from the position of the graphics cursor to the point stated.

Line 100 in the program VIS-SUB draws a subtraction sign : -
`PLOT 270,280` moves and `PLOT`s a pixel at point 270 horizontally (x coordinate) and 280 vertically (y coordinate). The next command `DRAW 330,280` then draws a line from the `PLOT` point to 330 horizontally (x coordinate) and 280 vertically (y coordinate). The diagram will help the explanation:-

As you will see from the diagram in all `MODE`s there are 640 horizontal pixels and 400 vertical pixels. The `ORIGIN` is the point with coordinates 0,0 and is at the bottom left hand corner of the screen.



Try this program:-

```
10 DRAW 100,200 : DRAW 300,150 : DRAW 0,0

20 PLOT 400,200 : DRAW 550,350 : DRAW 600,100 :

DRAW 400,200
```

Can you see how the ORIGIN has affected your result?

```
1 REM vis-sub
15 a$ = CHR$(143)+CHR$(143)
20 PEN 0 : INK 0,0 : PEN 1 : INK 1,6 : PEN 2 : INK
 2,26 : PEN 3 : INK 3,10
30 MODE 0 : BORDER 0 : PAPER 0 : CLS : PEN 2
35 LOCATE 7,5 : PRINT "SIMPLE" : LOCATE 7,8 : PRIN
T "VISUAL" : LOCATE 5,11 : PRINT "SUBTRACTION"
40 FOR t = 1 TO 1500 : NEXT t
50 MODE 0 : BORDER 14 : PAPER 1 : PEN 0 : CLS
60 a = 3 : b = 3 : c = INT(RND*5)+1 : d = INT(RND*
5)+1
65 IF c < d THEN 60
70 ON c GOSUB 350,345,340,335,330
80 a = 13 : b = 3
90 ON d GOSUB 350,345,340,335,330
100 PLOT 270,280,3 : DRAW 330,280,3
105 FOR f = 7 TO 3 STEP -1 : SOUND 1,2703,20,f,0,0
,15 : FOR t = 1 TO 100 : NEXT t : NEXT f
110 PEN 2 : LOCATE 8,20 : INPUT ans
120 IF c - d = ans THEN 150
125 PEN 3 : FOR h = 1 TO 20 STEP 5 : LOCATE h,24 :
 PRINT "NO" : NEXT h
130 LOCATE 1,25 : PRINT "answer is ";c-d : FOR t =
 1 TC 2500 : NEXT t : GOTO 50
150 FOR h = 1 TO 20 STEP 5 : LOCATE h,24 : PRINT "
GOOD" : GOSUB 400 : NEXT h
160 FOR m = 1 TO 10 : BORDER INT(RND*27) : GOSUB 4
00 : NEXT m
165 GOTO 50
330 LOCATE a+4,b+8 : PRINT a$ : LOCATE a+4,b+9 : P
RINT a$ : GOSUB 400
335 LOCATE a,b+8 : PRINT a$ : LOCATE a,b+9 : PRINT
 a$ : GOSUB 400
340 LOCATE a+2,b+4 : PRINT a$ : LOCATE a+2,b+5 : P
RINT a$ : GOSUB 400
345 LOCATE a+4,b : PRINT a$ : LOCATE a+4,b+1 : PRI
NT a$: GOSUB 400
```

```
350 LOCATE a,b : PRINT a$ : LOCATE a,b+1 : PRINT a
$ : GOSUB 400 : RETURN
400 SOUND 1,95,20,7 : FOR t = 1 TO 200 : NEXT t :
RETURN
```

```
1 REM vis-add
15 a$ = CHR$(143)+CHR$(143)
20 PEN 0 : INK 0,0 : PEN 1 : INK 1,6 : PEN 2 : INK
 2,26 : PEN 3 : INK 3,10
30 MODE 0 : BORDER 0 : PAPER 0 : CLS : PEN 2
35 LOCATE 6,5 : PRINT "S I M P L E" : LOCATE 6,8 :
 PRINT "V I S U A L" : LOCATE 4,11 : PRINT "A D D
I T I O N"
40 FOR t = 1 TO 1500 : NEXT t
50 MODE 0 : BORDER 14 : PAPER 1 : PEN 0 : CLS
60 a = 3 : b = 3 : c = INT(RND*5)+1
70 ON c GOSUB 350,345,340,335,330
80 a = 13 : b = 3 : d = INT(RND*5)+1
90 ON d GOSUB 350,345,340,335,330
100 PLOT 300,256,3 : DRAW 300,304 : PLOT 270,280 :
 DRAW 330,280
105 FOR f = 7 TO 3 STEP -1 : SOUND 1,2703,20,f,0,0
,15 : FOR t = 1 TO 100 : NEXT t : NEXT f
110 PEN 2 : LOCATE 8,20 : INPUT ans
120 IF c + d = ans THEN 150
125 PEN 3 : FOR h = 1 TO 20 STEP 5 : LOCATE h,24 :
 PRINT "NO" : NEXT h
130 LOCATE 1,25 : PRINT "answer is ";c+d : FOR t =
 1 TO 2500 : NEXT t : GOTO 50
150 FOR h = 1 TO 20 STEP 5 : LOCATE h,24 : PRINT "
GOOD" : GOSUB 400 : NEXT h
160 FOR m = 1 TO 10 : BORDER INT(RND*27) : GOSUB 4
00 : NEXT m
165 GOTO 50
330 LOCATE a+4,b+8 : PRINT a$ : LOCATE a+4,b+9 : P
RINT a$ : GOSUB 400
335 LOCATE a,b+8 : PRINT a$ : LOCATE a,b+9 : PRINT
 a$ : GOSUB 400
340 LOCATE a+2,b+4 : PRINT a$ : LOCATE a+2,b+5 : P
RINT a$ : GOSUB 400
345 LOCATE a+4,b : PRINT a$ : LOCATE a+4,b+1 : PRI
NT a$: GOSUB 400
350 LOCATE a,b : PRINT a$ : LOCATE a,b+1 : PRINT a
$ : GOSUB 400 : RETURN
400 SOUND 1,95,20,7 : FOR t = 1 TO 200 : NEXT t :
RETURN
```

DONKEY RACING AT THE STRAD STADIUM

a game for two players

PARENTS- this is a donkey racing game which practices the addition of three numbers and the use of brackets in mathematical statements, all within the four rules of number. The ten type of statements are:-

$X + Y - Z$

$Z - Y + X$

$(M * N) + X$

$(M \div N) + X$

$(M * N) - X$

$(M * N) \div (X * Y)$

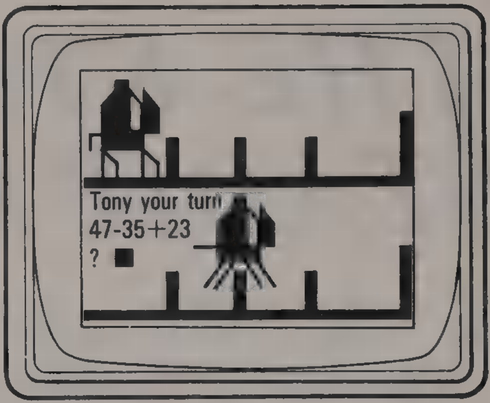
$Z - (M * N)$

$(X + Y)(Z + M)$

$X - (Y + Z)$

$(X + Y) - Z$

CHILDREN- how good are you at racing donkeys over the fences?! Now's your chance to try in this exciting game at the Strad Stadium. At the beginning of the program you will be asked for your names and then a dice is thrown to see who goes first. You move your donkey along the race course by answering the mathematical equation. You must press ENTER after each answer. If you are correct your donkey moves along the course. Good luck, safe racing and may the best donkey win!! As you move along the course your screen will look like this:-



```
Tony your turn
47-35+23
? ■
```

PROGRAMMING HINT - ON....GOSUB   ON....GOTO

Look at lines 180 and 190 and you will see the `ON....GOSUB` command. Line 180 picks a random number between 1 an 10 and assigns it to variable ‘a’.

`ON a GOSUB 200,250,300,350,400,450,500,550,600,650`
means that if a = 1 then the first line number in the list is chosen, in this case 200 so the command is `GO SUB 200.` If a = 2 then the second line number in the list is chosen and the command in this case becomes `GOSUB 250.` As this is a `GOSUB` statement the program will return to the next command which is line 195. The same principle applies for the `ON....GOTO` command, only this time the program branching does not return to the next statement as it is a `GOTO` command.

```
1 REM donkey
10 z$ = CHR$(143)+CHR$(143) : y$ = CHR$(32)+CHR$(3
2)+CHR$(32)+CHR$(32)+CHR$(32)+CHR$(32)+CHR$(32) :
x$ = CHR$(32)+CHR$(32)
40 PEN 0 : INK 0,18 : PEN 1 : INK 1,0 : PEN 2 : IN
K 2,24 : PEN 3 : INK 3,6
50 WINDOW #1,1,40,1,25
55 WINDOW #2,1,40,11,14
65 PAPER #1,1 : PAPER #2,1
70 CLS #1 : CLS #2
72 LOCATE #1,7,3 : PEN #1,2 : PRINT #1,"D O N K E
Y   R A C I N G" : LOCATE #1,14,5 : PRINT #1,"A T
 T H E"
74 LOCATE #1,7,7 : PRINT #1,"S T R A D   S T A D I
 U M" : J = 20 : K = 13 : GOSUB 900
```

```
76 FOR bv = 1 TO 30 : SOUND 1,379,10,6 : FOR t = 1
 TO 200 : NEXT t : BORDER INT(RND*27) : NEXT bv
80 CLS #1 : CLS #2
85 GOSUB 950
90 cone = 0 : ctwo = 0
95 CLS #1 : GOSUB 800
100 IF r > s THEN GOTO 120
110 IF r < s THEN GOTO 140
120 CLS #2 : PEN #2,3 : PRINT #2,nameone$;", your
turn" : LOCATE #2,5,2 : GOSUB 180
125 LOCATE #2,5,3 : INPUT #2,ans
130 IF ans = sna THEN cone = cone + 1 : GOSUB 700
132 IF ans <> sna THEN GOSUB 1100
135 IF cone = 8 GOTO 780
140 CLS #2 :PEN #2,3 : PRINT #2,nametwo$;", your t
urn" : LOCATE #2,5,2 : GOSUB 180
145 LOCATE #2,5,3 : INPUT #2,ans
150 IF ans = sna THEN ctwo = ctwo + 1 : GOSUB 750
152 IF ans <> sna THEN GOSUB 1100
155 IF ctwo = 8 GOTO 780
160 GOTO 120
180 a = INT(RND*10)+1
190 ON a GOSUB 200,250,300,350,400,450,500,550,600
,650
195 RETURN
200 x = INT(RND*50) : y = INT(RND*50) : z = INT(RN
D*50)
202 IF x + y < z THEN 200
205 PRINT #2,x;" + ";y;" - ";z
210 sna = x + y - z
215 RETURN
250 x = INT(RND*50) : y = INT(RND*50) : z = INT(RN
D*50)
252 IF z < y THEN 250
254 IF y + x < z THEN 250
260 PRINT #2,z;" - ";y;" + ";x
265 sna = z - y + x
270 RETURN
300 m = INT(RND*10) : n = INT(RND*10) : x = INT(RN
D*50)
305 PRINT #2,"(";m;" * ";n;") + ";x
310 sna = (m*n)+x
315 RETURN
350 m = INT(RND*10)+1 : n = INT(RND*10)+1 : wv = m
*n : x = INT(RND*50)
355 PRINT #2,"(";wv;CHR$(37);n;") + ";x
360 sna = (wv/n)+x
370 RETURN
400 m = INT(RND*10) : n = INT(RND*10) : x = INT(RN
D*30)
```

```
405 IF m*n < x THEN 400
410 PRINT #2,"(";m;" * ";n;") - ";x
415 sna = (m*n) - x
420 RETURN
450 m = INT(RND*5)+1 : n = INT(RND*5)+1 : x = INT(
RND*10)+1 : y = INT(RND*10)+1
455 PRINT #2,"(";m*x;" * ";n*y;")";CHR$(37);"(";x;
" * "y;")"
460 sna = (m*x*n*y)/(x*y)
465 RETURN
500 m = INT(RND*10)+1 : n = INT(RND*10)+1 : z = IN
T(RND*100)
505 IF m*n > z THEN 500
515 PRINT #2,z;" - (";m;" * ";n;")"
520 sna = z-(m*n)
525 RETURN
550 x = INT(RND*10)+1 : y = INT(RND*10)+1 : z = IN
T(RND*10)+1 : m = INT(RND*10)+1
555 PRINT #2,"(";x;" + ";y;")(";z;" + ";m;")"
560 sna = (x+y)*(z+m)
565 RETURN
600 x = INT(RND*50) : y = INT(RND*20) : z = INT(RN
D*20)
602 IF x < y+z THEN 600
605 PRINT #2,x;" - (";y;" + ";z;")"
610 sna = x-(y+z)
615 RETURN
650 x = INT(RND*50) : y = INT(RND*50) : z = INT(RN
D*50)
652 IF x+y < z THEN 650
655 PRINT #2,"(";x;" +";y;") - ";z
660 sna = x+y-z
665 RETURN
700 IF cone = 1 THEN d = 4 : e = 3 : GOSUB 850
702 IF cone = 2 THEN d = 4 : e = 3 : GOSUB 880 : j
 = 10 : k = 1 : GOSUB 900
704 IF cone = 3 THEN j = 10 : k = 1 : GOSUB 930 :
d = 14 : e = 3 : GOSUB 850
706 IF cone = 4 THEN d = 14 : e = 3 : GOSUB 880 :
j = 20 : k = 1 : GOSUB 900
708 IF cone = 5 THEN j = 20 : k = 1 : GOSUB 930 :
d = 24 : e = 3 : GOSUB 850
710 IF cone = 6 THEN d = 24 : e = 3 : GOSUB 880 :
j = 30 : k = 1 : GOSUB 900
712 IF cone = 7 THEN j = 30 : k = 1 : GOSUB 930 :
d = 34 : e = 3 : GOSUB 850
714 IF cone = 8 THEN CLS #2 : PRINT #2 : PRINT #2,
"......";nameone$;" is the winner
718 SOUND 1,2145,20,5
720 RETURN
```

```
750 IF ctwo = 1 THEN d = 4 : e = 17 : GOSUB 850
752 IF ctwo = 2 THEN d = 4 : e = 17 : GOSUB 880 :
j = 10 : k = 15 : GOSUB 900
754 IF ctwo = 3 THEN j = 10 : k = 15 : GOSUB 930 :
 d = 14 : e = 17 : GOSUB 850
756 IF ctwo = 4 THEN d = 14 : e = 17 : GOSUB 880 :
 j = 20 : k = 15 : GOSUB 900
758 IF ctwo = 5 THEN j = 20 : k = 15 : GOSUB 930 :
 d = 24 : e = 17 : GOSUB 850
760 IF ctwo = 6 THEN d = 24 : e = 17 : GOSUB 880 :
 j = 30 : k = 15: GOSUB 900
762 IF ctwo = 7 THEN j = 30 : k = 15 : GOSUB 930 :
 d = 34 : e = 17 : GOSUB 850
764 IF ctwo = 8 THEN CLS #2 : PRINT #2 : PRINT #2,
"......";nametwo$;" is the winner
768 SOUND 1,30,20,5
770 RETURN
780 FOR ab = 1 TO 35 : SOUND 1,106,20,6 : FOR t =
1 TO 250 : NEXT t : BORDER INT(RND*27) : NEXT ab :
 END
800 FOR b = 0 TO 39 : PEN #1,0 : LOCATE #1,1+b,10
: PRINT #1,CHR$(143) : LOCATE #1,1+b,24 : PRINT #1
,CHR$(143) : NEXT b
805 FOR b = 0 TO 30 STEP 10 : FOR c = 0 TO 2 : LOC
ATE #1,10+b,7+c : PRINT #1,CHR$(143) : LOCATE #1,1
0+b,21+c : PRINT #1,CHR$(143) : NEXT c : NEXT b
810 LOCATE #1,40,6 : PRINT #1,CHR$(143) : LOCATE #
1,40,20 : PRINT #1,CHR$(143) : PEN #1,3 : LOCATE #
1,40,5 : PRINT #1,CHR$(70) : LOCATE #1,40,19 : PRI
NT #1,CHR$(70)
815 RETURN
850 LOCATE #1,d,e : PRINT #1,CHR$(143) : LOCATE #1
,d-1,e+1 : PRINT #1,CHR$(214)CHR$(143)CHR$(205)CHR
$(215)
855 LOCATE #1,d-1,e+2 : PRINT #1,z$;CHR$(32)CHR$(1
43)CHR$(133) : LOCATE #1,d-3,e+3 : PRINT #1,CHR$(1
36)CHR$(140);z$;CHR$(140)CHR$(131)CHR$(129)
860 LOCATE #1,d-3,e+4 : PRINT #1,CHR$(138)CHR$(209
);z$;CHR$(143) : LOCATE #1,d-3,e+5 : PRINT #1,CHR$
(138)CHR$(209)CHR$(205)CHR$(32)CHR$(209)CHR$(205)
865 LOCATE #1,d-2,e+6 : PRINT #1,CHR$(209)CHR$(209
)CHR$(32)CHR$(209)CHR$(209)
870 RETURN
880 FOR g = 0 TO 6 : LOCATE #1,d-3,e+g : PRINT #1,
y$ : NEXT g : RETURN
900 LOCATE #1,j,k : PRINT #1,CHR$(143) : LOCATE #1
,j-1,k+1 : PRINT #1,CHR$(214)CHR$(143)CHR$(205)CHR
$(215)
905 LOCATE #1,j-1,k+2 : PRINT #1,z$;CHR$(32)CHR$(1
43)CHR$(133) : LOCATE #1,j-3,k+3 : PRINT #1,CHR$(1
54)CHR$(154);z$;CHR$(140)CHR$(131)CHR$(129)
910 LOCATE #1,j-1,k+4 : PRINT #1,z$;CHR$(143) : LO
CATE #1,j-2,k+5 : PRINT #1,CHR$(204)CHR$(204)CHR$(
32)CHR$(205)CHR$(205)
915 LOCATE #1,j-3,k+6 : PRINT #1,CHR$(204)CHR$(204
) : LOCATE #1,j+2,k+6 : PRINT #1,CHR$(205)CHR$(205
)
920 RETURN
930 FOR g = 0 TO 5 : LOCATE #1,j-3,k+g : PRINT #1,
y$ : NEXT g : LOCATE #1,j-3,k+6 : PRINT #1,x$ : LO
CATE #1,j+2,k+6 : PRINT #1,x$ : RETURN
940 FOR t = 1 TO 2500 : NEXT t : RETURN
950 CLS #1 : PEN #1,3 : PRINT #1,"Let's see who go
es first" : PRINT #1,"What is your name" : INPUT #
1,nameone$
955 PRINT #1 : PRINT #1,"What is your name" : INPU
T #1,nametwo$ : PRINT #1 : PRINT #1,"Now roll a di
ce to see who goes first" : FOR t = 1 TO 3000 : NE
XT t
960 CLS #1 : PRINT #1,nameone$;" you roll first" :
 PRINT #1 : PRINT #1,"Hit any key to roll"
965 a$ = INKEY$ : IF a$ = "" THEN 965
970 r = INT(RND*7) : GOSUB 1000 : PRINT #1,r : GOS
UB 940
975 CLS #1 : PRINT #1,nametwo$;",your turn" : PRIN
T #1 : PRINT #1,"Hit any KEY TO roll"
980 a$ = INKEY$ : IF a$ = "" THEN 980
985 s = INT(RND*7) : PEN #1,3 : GOSUB 1000 : PRINT
 #1,s : GOSUB 940
990 CLS #1 : PRINT #1,nameone$;", your score was "
;r : PRINT #1 : PRINT #1,nametwo$;", your score wa
s ";s
992 IF r = s THEN PRINT #1,"scores equal, roll aga
in" : GOSUB 940 : GOTO 950
993 IF r > s THEN PRINT #1,nameone$;", you won and
 use the top horse"
994 IF r < s THEN PRINT #1,nametwo$;", you won and
 use the bottom horse"
995 PRINT #1,"the winner goes first" : FOR t = 1 T
O 8000 : NEXT t : RETURN
1000 FOR u = 0 TO 36 STEP 13 : LOCATE #1,4+u,9 : P
RINT #1,CHR$(214)CHR$(215) : LOCATE #1,3+u,10 : PR
INT #1,CHR$(214)CHR$(143)CHR$(143)CHR$(215)
1005 LOCATE #1,2+u,11 : PRINT #1,CHR$(214);z$;z$;C
HR$(215) : LOCATE #1,2+u,12 : PRINT #1,CHR$(213);z
$;z$;CHR$(212)
1010 LOCATE #1,3+u,13 : PRINT #1,CHR$(213)CHR$(143
)CHR$(143)CHR$(212) : LOCATE #1,4+u,14 : PRINT #1,
CHR$(213)CHR$(212) : FOR t = 1 TO 250 : NEXT t
1015 CLS #1 : FOR h = 0 TO 4 : FOR hh = 0 TO 4 : L
```

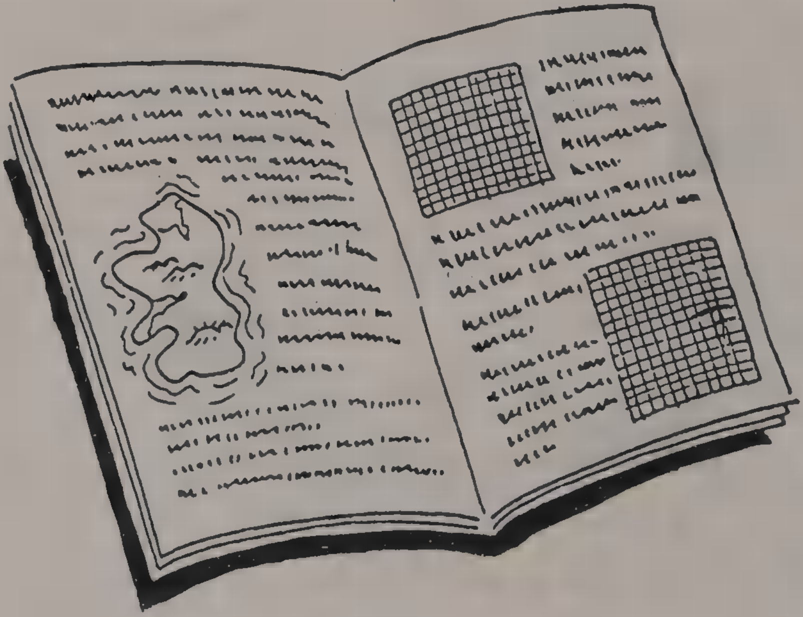
```
OCATE #1,9+h+u,10+hh : PRINT #1,CHR$(143) : NEXT h
h :NEXT h : FOR t = 1 TO 250 : NEXT t
1020 IF u = 26 THEN 1030
1025 CLS #1 : NEXT u
1030 PEN #1,0 : LOCATE #1,36,12 : RETURN
1100 PRINT #2,"no, answer is ";sna : GOSUB 940 : R
ETURN
```

SMUGGLERS

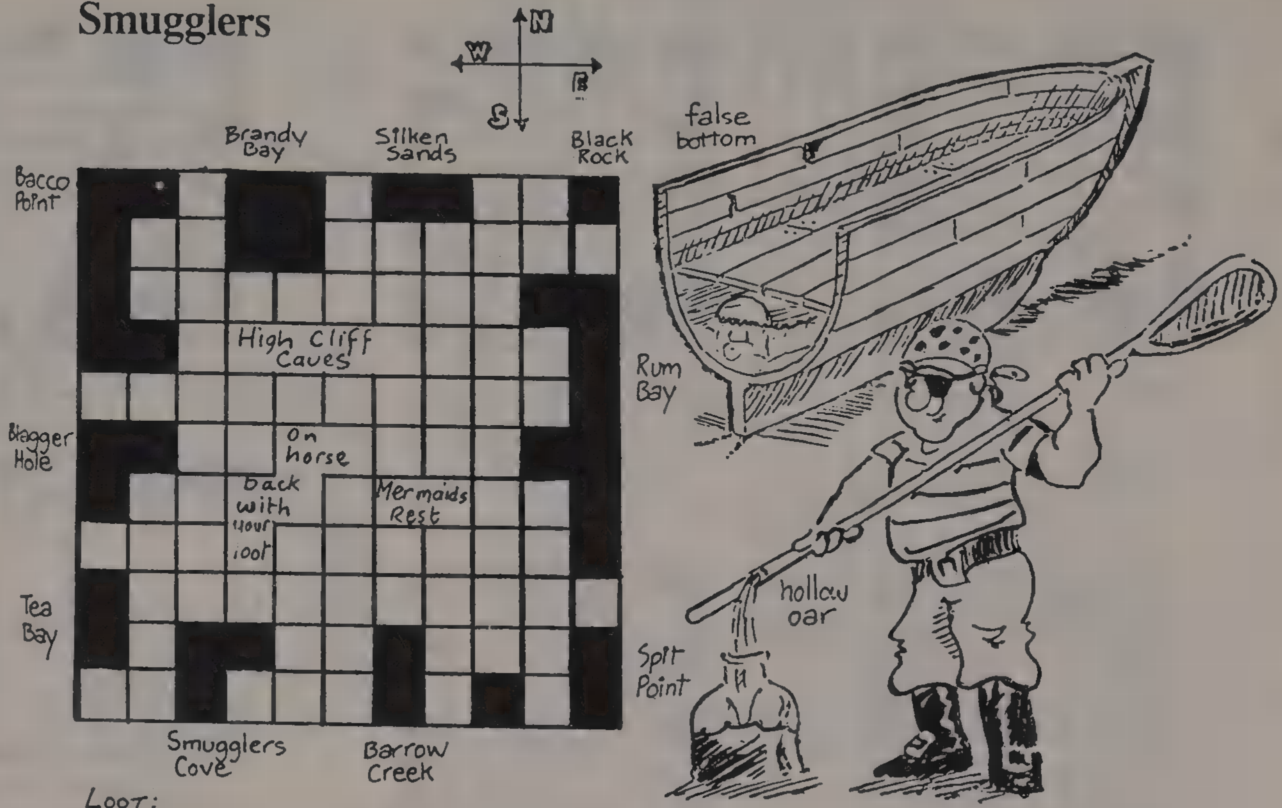
PARENTS AND CHILDREN- I hope you will enjoy playing this simulation game and at the same time, whilst trying to discover the whereabouts of hidden contraband, learn ■ little about a smuggler's life.

MAKE A BOOKLET

There are two smuggler's sheets which you can copy to help you play the game. The large grid has all the various locations included, whilst the five smaller grids can be used to play the game against ■ friend, your mum or dad, or your teacher, perhaps. Try making ■ four-page booklet out of these instruction notes. In your booklet enter the historical facts, the rules and the grid showing the bays and inlets. Copy the page with five grids- keep these as you use them so that you can look back on your games. Add your own designs and illustrations to the booklet- find out more about smugglers and their ways. You may, of course, prefer to draw a permanent grid on cardboard, and mark the bays and inlets on this, and then use the counters for your positions, but remember to keep an account of your loot.

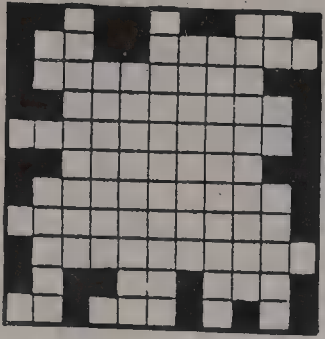


Smugglers



Loot: ______________________

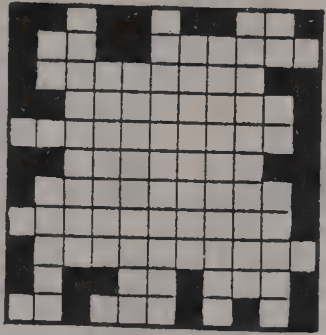
Smugglers



LOOT: ______

Rum

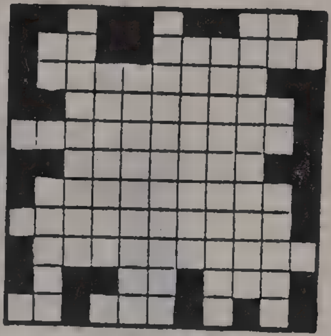
Tea



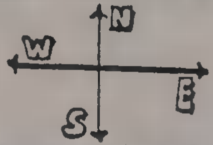
LOOT: ______

Silk

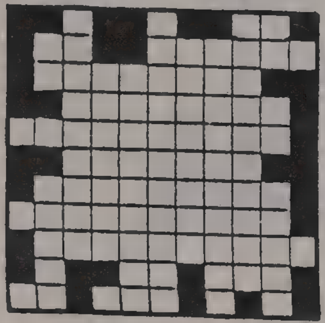
Tobacco



LOOT: ______



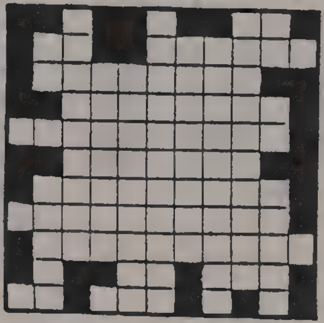
Your
Name



LOOT: ______

Brandy

Port



LOOT: ______

______

______

______

______

______

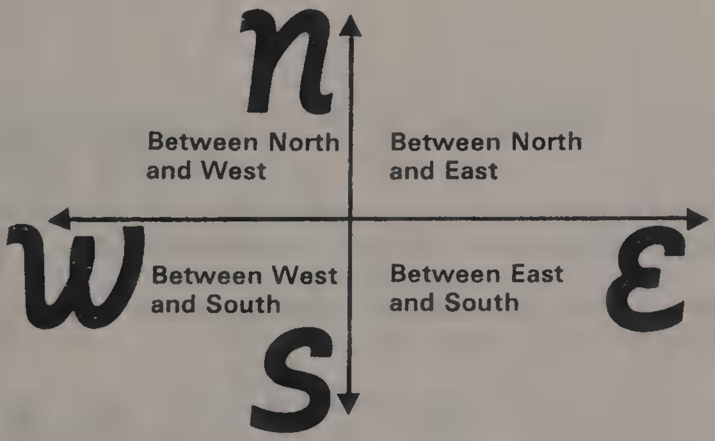
TOTAL LOOT ______

SETTING THE SCENE

During the late 18th and early 19th Century, Britain was expanding her Empire throughout the world. She was also involved in various wars in Europe and America. In order to raise money for all these activities, high taxes were imposed on goods being brought into the country. As a result, smuggling became widespread along the coasts of Britain and for many people living in towns and villages on the coast, it was a full time occupation. Smuggling was an accepted way of life and it was often carried out in broad daylight. A customs and excise service was set up to try to catch the smugglers and customs officers patrolled the coastline, but there were never enough of them to guard all the shores known to the smugglers. Fortunes could be made by the skippers of boats who landed the goods illegally, thus avoiding the excise duties. Smuggling gangs of up to 100 men were commonplace and were highly organised. They knew the creeks, inlets, caves and even open beaches where it was safe to land contraband. Boats had false bottoms which concealed the illicit goods; barrels of spirits were weighted so that they floated just below the surface of the water. They were then towed into harbour and collected later. There were many other smuggling tricks and devices which were used to thwart the customs officers. The few hauls that the customs officers did make were sold off by public auction and the proceeds paid over to the Government.

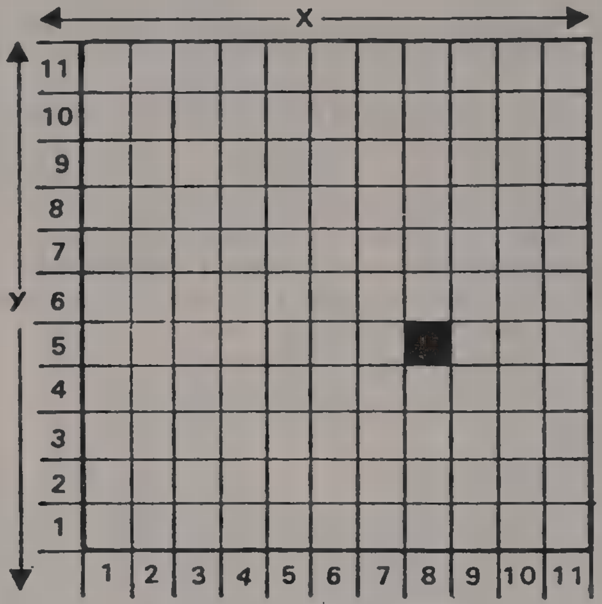
INSTRUCTIONS FOR THE GAME

Your task is to find the smuggled goods by using co-ordinates on the grid. Eleven coastguards patrol the beaches and coves, and they may catch you at any time. Punishment is prison. Other surprises await you, too. Your loot, if found, will vary, but it will always have a value- a value appropriate to those of smuggling times. You will be given clues on the screen as to the whereabouts of the loot. Your direction instructions are based on the four main compass points.



You must go directly N, S, E or W, or between these four points, on a grid measuring 11 squares by 11 squares. Your co-ordinates are "X" for the horizontal axis and "Y" for the vertical axis.

For instance, your co-ordinate point (8,5) is 8 along the "X" axis and 5 along the "Y" axis.



Remember to press the ENTER key after each co-ordinate. For example:-

8 ENTER

5 ENTER

As you input your co-ordinates, mark these on your grid and then move in the given direction.

You should be able to find the treasure in under six moves, unless the coastguard catches you! Even as you discover your loot, you may get caught!

In each game, your smuggled goods will be in a different position on your map. Loot can be hidden either on the land or in the sea.

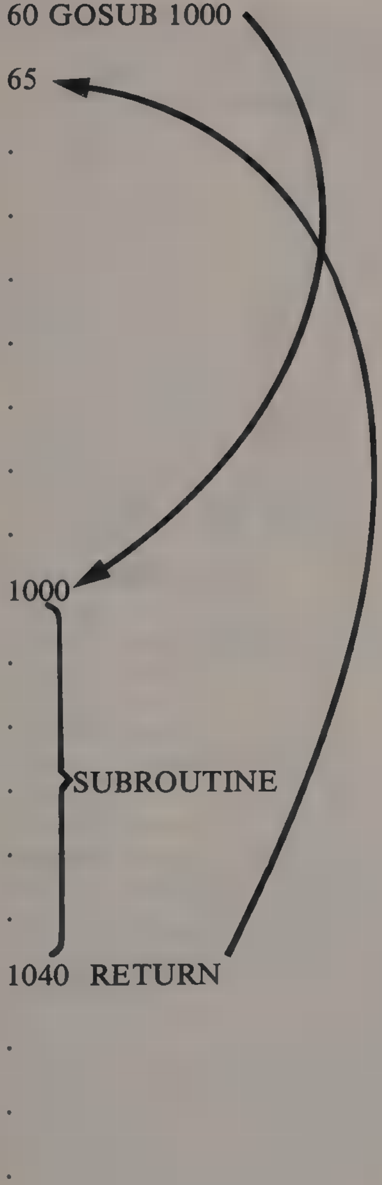
Play five games of SMUGGLERS each and then total up the value of your loot to find the winner.

PROGRAMMING HINT - SUBROUTINES

When planning a program, there will be occasions when you wish to repeat sections.

The repetition of sections is long and tedious and there is always a chance of making typing errors. Hence ■ technique has been developed where repetition is unnecessary. This technique will produce ■ SUBROUTINE- a branch in your program that can be executed and then `RETURN`ed to the next instruction prior to your SUBROUTINE.

In line 60 you will find the statement `GOSUB 1000`. When the program reaches this instruction, it goes to line 1000, carries out the instruction (in this case, prints the ship on the screen) and then `RETURN`s to the next instruction which is at line 65.



```
1 REM smugglers
10 b$ = CHR$(32)+CHR$(32) : c$ = CHR$(143)+CHR$(14
3)+CHR$(143)+CHR$(143) : d$ = CHR$(143)+CHR$(143)+
CHR$(143)
12 ca$ = " Move "
20 PEN 0 : INK 0,0 : PEN 1 : INK 1,6 : PEN 2 : INK
 2,18 : PEN 3 : INK 3,26
30 WINDOW #1,1,40,1,25 : WINDOW #2,13,27,1,12 : WI
NDOW #3,2,39,17,24
50 BORDER 0 : PAPER #1,0 : CLS #1
60 GOSUB 1000
65 PAPER #3,2 : CLS #3 : PEN #3,1 : LOCATE #3,7,2
: PRINT #3,"S  M  U  G  G  L  E  R  S" : LOCATE #3
,6,5 : PRINT #3,"TRY TO BEAT THE COASTGUARD" : PRI
NT #3 : PRINT #3,TAB(14);"ADJN 1984"
70 GOSUB 900
100 m = INT(RND*11)+1 : n = INT(RND*11)+1
115 tt = 0
120 tt = tt + 1 : IF tt > 6 THEN 850
125 q = INT(RND*500)+500
127 k = INT(RND*1000)+1000
130 c = INT(RND*11)+1
132 f = INT(RND*11)+1
135 g = INT(RND*11)+1
137 h = INT(RND*11)+1
150 PAPER #3,3 : CLS #3 : PEN #3,0 : LOCATE #3,4,2
 : PRINT #3,"Plot your position." : PRINT #3,"Pres
s ENTER after each coordinate
160 LOCATE #3,10,5 : INPUT #3,x
170 LOCATE #3,18,5 : INPUT #3,y
180 PRINT #3 : PRINT #3," Your cordinates are";x;"
,";y
190 IF x > 11 AND y > 11 THEN 210
192 IF x > 11 THEN 212
194 IF y > 11 THEN 214
196 IF x < 1 AND y < 1 THEN 216
198 IF x < 1 THEN 218
200 IF y < 1 THEN 220
205 GOTO 300
210 PEN #3,1 : PRINT #3," Coordinates too large,tr
y again." : GOTO 255
212 PEN #3,1 : PRINT #3,x; : GOTO 250
214 PEN #3,1 : PRINT #3,y; : GOTO 250
216 PEN #3,1 : PRINT #3,"Coordinates too small,try
 again" : GOTO 255
218 PEN #3,1 : PRINT #3,x; : GOTO 253
220 PEN #3,1 : PRINT #3,y; : GOTO 253
250 PRINT #3," Coordinate too large,try again" : G
OTO 255
253 PRINT #3," Coordinate too small,try again"
```

```
255 GOSUB 898 : GOTO 150
300 IF x = c AND y = f THEN GOSUB 1500 : GOTO 100
302 IF x = f AND y = c THEN GOSUB 1500 : GOTO 100

304 IF x = h AND y = g THEN GOSUB 1500 : GOTO 100

306 IF x = c AND y = h THEN GOSUB 1500 : GOTO 100

308 IF x = g AND y = c THEN GOSUB 1500 : GOTO 100
310 IF x = g AND y = h THEN GOSUB 1500 : GOTO 100

312 IF x = c AND y = g THEN GOSUB 1500 : GOTO 100
314 IF x = c AND y = c THEN GOSUB 1500 : GOTO 100

316 IF x = f AND y = h THEN GOSUB 1500 : GOTO 100

318 IF x = f AND y = g THEN GOSUB 1500 : GOTO 100

320 IF n = y AND m = x THEN 500
330 IF m = x AND y > m THEN 950
340 IF m = x AND y < n THEN 951
350 IF n = y AND x > m THEN 952
360 IF n = y AND x < m THEN 953
370 IF m < x AND y > n THEN 954
380 IF m < x AND n > y THEN 955
390 IF m > x AND n > y THEN 956
400 IF m > x AND n < y THEN 957
500 PRINT #3,"Good, but what have you smuggled?"
501 GOSUB 900
502 IF m = 1 AND n >= 8 THEN 1600
503 IF m = 2 AND n = 8 THEN 1600
504 IF m = 2 AND n = 11 THEN 1600
510 IF m = 4 AND n >= 10 THEN 1700
512 IF m = 5 AND n >= 10 THEN 1700
520 IF m = 7 AND n = 11 THEN 1800
522 IF m = 8 AND n = 11 THEN 1800
530 IF m = 11 AND n = 11 THEN 1900
540 IF m = 1 AND n = 5 THEN 2000
542 IF m <= 2 AND n = 6 THEN 2000
550 IF m = 1 AND n = 2 THEN 2100
552 IF m = 1 AND n = 3 THEN 2100
560 IF m = 3 AND n <= 2 THEN 2200
562 IF m = 4 AND n = 2 THEN 2200
570 IF m = 7 AND n <= 2 THEN 2300
572 IF m = 9 AND n = 1 THEN 2300
582 IF m = 11 AND n >= 4 AND n <= 9 THEN 2400
586 IF m = 10 AND n = 6 THEN 2400
587 IF m = 10 AND n = 9 THEN 2400
590 IF m = 11 AND n <= 2 THEN 2500
600 IF m = 7 AND n = 5 THEN 2600
```

```
602 IF m = 8 AND n = 5 THEN 2600
614 IF m >= 4 AND m <= 7 AND n = 8 THEN 2700
620 IF m = 4 AND n = 4 THEN 2800
622 IF m = 4 AND n = 5 THEN 2800
624 IF m = 5 AND n = 5 THEN 2800
626 IF m = 5 AND n = 6 THEN 2800
628 IF m = 6 AND n = 6 THEN 2800
630 CLS #3 : CLS #2 : CLS #1 : bb = INT(RND*6)+1
635 IF bb = 1 THEN j$ = "RECTORY CELLARS"
640 IF bb = 2 THEN j$ = "CHURCH CRYPT"
645 IF bb = 3 THEN j$ = "QUARRIES"
650 IF bb = 4 THEN j$ = "CAVE IN THE CLIFFS"
655 IF bb = 5 THEN j$ = "ROOF IN THE CHURCH"
660 IF bb = 6 THEN j$ = "NEARBY BARN"
665 gg = INT(RND*20)+1
670 LOCATE #1,5,3 : PEN #1,3 : PRINT #1,"S A F E
L A N D I N G"
675 PRINT #1 : PRINT #1,q;"litres of port worth #"
;q*3/100
680 PRINT #1 : PRINT #1,"   hidden in the ";j$
685 IF gg <= 6 THEN 1500
690 GOSUB 700 : GOTO 750
700 PAPER #3,1 : CLS #3 : PEN #3,0 : PRINT #3 : PR
INT #3," Mark your loot by your map"
705 PRINT #3 : PRINT #3
710 PRINT #3," Hit any key to continue"
712 a$ = INKEY$ : IF a$ = "" THEN 712
715 RETURN
750 CLS #1 : CLS #2 : GOSUB 1000 : CLS #3 : LOCATE
 #3,3,3 : PRINT #3,"Do you want another go?" : LOC
ATE #3,3,5 : INPUT #3,an$
755 IF LEFT$(an$,1) = "y" THEN 100
760 IF LEFT$(an$,1) = "yes" THEN 100
765 LOCATE #3,3,7 : PRINT #3,"Cheerio,have another
 go later."
770 END
850 CLS #3 : PAPER #3,3 : PEN #3,0 : LOCATE #3,2,3
 : PRINT #3,"You've taken too long to smuggle" : P
RINT #3 : PRINT #3,"your loot ashore. All your loo
t" : PRINT #3 : PRINT #3,"is lost. TRY AGAIN"
855 GOSUB 890 : GOTO 100
890 FOR e = 1000 TO 100 STEP -20 : SOUND 1,e,20,7
: NEXT e : RETURN
898 FOR t = 1 TO 3500 : NEXT t : RETURN
899 FOR t = 1 TO 2500 : NEXT t : GOTO 120
900 FOR a = 1 TO 5 : SOUND 1,478,20,7 : SOUND 2,11
9,20,7 : FOR t = 1 TO 200 : NEXT t : NEXT a : RETU
RN
950 PRINT #3,ca$;"South" : GOTO 899
951 PRINT #3,ca$;"North" : GOTO 899
```

```
952 PRINT #3,ca$;"West" : GOTO 899
953 PRINT #3,ca$;"East" : GOTO 899
954 PRINT #3,ca$;"South West" : GOTO 899
955 PRINT #3,ca$;"North West" : GOTO 899
956 PRINT #3,ca$;"North East" : GOTO 899
957 PRINT #3,ca$;"South East" : GOTO 899
960 GOTO 899
1000 PEN #2,2 : PRINT #2,TAB(5);CHR$(140)CHR$(143)
CHR$(205) : PRINT #2,TAB(6);CHR$(140)CHR$(140)CHR$
(205)
1005 PRINT #2,TAB(6);CHR$(143)CHR$(143)CHR$(32)CHR
$(205) : PRINT #2,TAB(3);CHR$(136);b$;CHR$(131)CHR
$(131);b$;CHR$(205)
1010 PRINT #2,TAB(3);CHR$(138)CHR$(141)CHR$(132)CH
R$(209)CHR$(210);b$;CHR$(32)CHR$(205)
1015 PRINT #2,TAB(3);CHR$(138)CHR$(143)CHR$(141)CH
R$(209)CHR$(32);c$;CHR$(215)
1020 PRINT #2,TAB(3);CHR$(142)CHR$(143)CHR$(143)CH
R$(141)CHR$(32)CHR$(143);c$;CHR$(215)
1025 PRINT #2,TAB(2);CHR$(136)CHR$(142);d$;CHR$(13
6)CHR$(143)CHR$(143);c$;CHR$(215)
1030 PRINT #2,CHR$(136)CHR$(142);c$;CHR$(138);c$;d
$;CHR$(215) : LOCATE #2,1,10 : PRINT #2,CHR$(131)C
HR$(131)CHR$(139);d$;CHR$(142)CHR$(140)CHR$(129);b
$;CHR$(32)CHR$(210)CHR$(204)
1035 PEN #2,1 : LOCATE #2,1,11 : PRINT #2,c$;c$;d$
;CHR$(212) : PRINT #2,CHR$(213);d$;d$;d$;CHR$(212)

1040 RETURN
1200 PRINT #3 : PRINT #3," Hit any key to continue
"
1205 a$ = INKEY$ : IF a$ = "" THEN 1205
1210 GOTO 750
1500 CLS #1 : PEN #1,1 : FOR w = 0 TO 420 STEP 60
: CLS #1 : PLOT 8+w,90,1 : DRAW 15+w,106,1 : DRAW
55+w,60 : DRAW 90+w,128 : PLOT 132+w,6 : DRAW 117+
w,16 : DRAW 128+w,69 : DRAW 90+w,128 : DRAW 90+w,2
08 : DRAW 65+w,176 : DRAW 80+w,130
1510 PLOT 158+w,192 : DRAW 120+w,176 : DRAW 90+w,2
08 : DRAW 90+w,224 : DRAW 84+w,218 : DRAW 84+w,240
 : DRAW 99+w,250 : DRAW 99+w,230 : DRAW 90+w,224
1520 PRINT #1," CAUGHT BY THE COASTGUARD" : SOUND
1,758,20,7,0,0,15 : FOR t = 1 TO 200 : NEXT t : NE
XT w
1530 CLS #1 : GOTO 750
1600 CLS #3 : PRINT #3 : PRINT #3," T O B A C C O
  P O I N T" : PRINT #3 : PRINT #3," Tobacco worth
 #";k*1/2
1605 GOTO 1200
1700 CLS #3 : PRINT #3 : PRINT #3," B R A N D Y
```

```
 B A Y" : PRINT #3 : PRINT #3,q;" litres of brandy
 worth #";q*7/100
1705 GOSUB 900 : GOTO 1200
1800 CLS #3 : PRINT #3 : PRINT #3," LANDING AT SIL
KEN SANDS" : PRINT #3 : PRINT #3," Silk Worth #";q
*1/2
1805 GOSUB 900 : GOTO 1200
1900 CLS #1 : GOSUB 1000 : PEN #1,2 : LOCATE #1,3,
15 : PRINT #1,"B L A C K -------- R O C K" : PRINT
 #1 : PRINT #1," S T R I K E S-----------A G A I N
" : PRINT #1 : PRINT #1,"W H A T ---A--- W A S T E
"
1905 PRINT #1 : PRINT #1," All your spirits are lo
st"
1910 PRINT #1 : PRINT #1," Hit any key to continue
"
1915 a$ = INKEY$ : IF a$ = "" THEN 1915
1920 CLS #1 : GOTO 750
2000 CLS #1 : PEN #1,1 : LOCATE #1,7,3 : PRINT #1,
"A H O Y  S H I P M A T E S"
2005 PEN #1,2 : PRINT #1,TAB(15);"*** ha ***" : PR
INT #1,TAB(15);"*** ha ***" : PRINT #1
2010 PEN #1,3 : PRINT #1,TAB(5);"BOAT  SANK  AT  B
LAGGER  POINT" : PRINT #1 : PRINT #1,TAB(7);"ALL
YOUR  LOOT  IS  LOST"
2015 PRINT #1 : PEN #1,1 : PRINT #1,TAB(8);"BETTER
  LUCK  NEXT  TIME" : GOSUB 900
2020 GOTO 750
2100 CLS #3 : PEN #3,2 : LOCATE #3,10,2 : PRINT #3
,"T E A   B A Y" : PRINT #3 : PRINT #3,"Tea worth
#";k*60/100
2105 GOTO 1200
2200 CLS #3 : PEN #3,0 : LOCATE #3,10,2 : PRINT #3
,"SMUGGLERS  COVE" : PRINT #3 : PRINT #3,q;"litres
 of brandy worth #";q*7/100
2205 GOTO 1200
2300 CLS #3 : PEN #3,0 : PRINT #3 : PRINT #3," WHA
T A LOT OF RUBBISH"
2305 PRINT #3 : PRINT #3,"O--L--D    B--O--O--T--S
" : GOTO 1200
2400 CLS #3 : PEN #3,0 : PRINT #3 : PRINT #3,"  R*
*U**M   B**A**Y" : PRINT #3 : PRINT #3,q;"litres o
f rum worth #";q*5/100 : GOTO 1200
2500 CLS #3 : PRINT #3 : PRINT #3," S--P--I--T   P
--O--I--N--T" : PRINT #3 : PRINT #3,q;"litres of s
herry worth #";q*3/100 : GOTO 1200
2600 CLS #3 : PRINT #3 : PRINT #3," M E R M A I D
S  R E S T" : PRINT #3 : PRINT #3," Silk worth #"
;q*1/2 : GOTO 1200
2700 CLS #3 : PRINT #3 : PRINT #3," H I G H  C L I
```

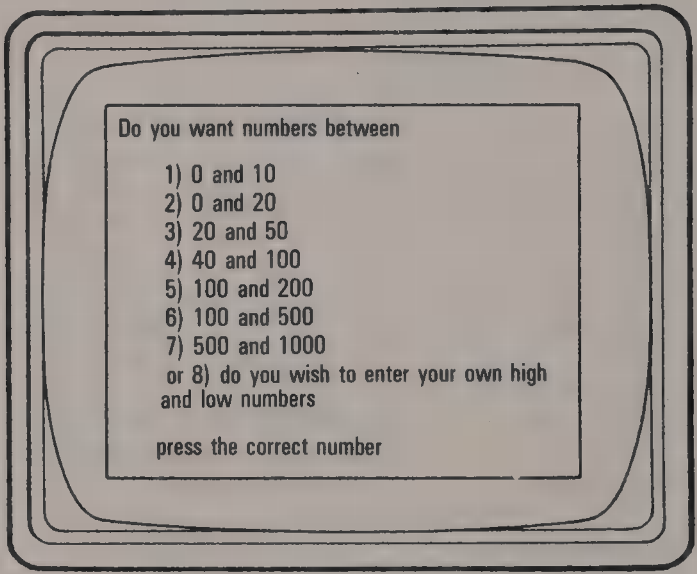
```
 F F   C A V E S" : PRINT #3 : PRINT #3," Tobacco
worth #";q*1/2 : PRINT #3," Silk worth #";q*1/2
2705 GOTO 1200
2800 CLS #1 : PEN #1,2 : LOCATE #1,5,5 : PRINT #1,
"...N..E..I..G..H..." : PRINT #1 : PRINT #1,TAB(8)
;"C L I P-------C L O P"
2805 PRINT #1 : PRINT #1,TAB(12);"C L I P---------
C L O P" : PRINT #1 : PRINT #1," Away on horse bac
k with the loot"
2810 PRINT #1 : PRINT #1,"  Tea worth #";k*60/100
: PRINT #1 : PRINT #1,"  Silk worth #";q*1/2 : GOT
O 1200
```

MOON-BUGGY

A game for two players.

PARENTS- this is a program to help children improve their mental arithmetic as Moon Buggies are raced across the surface of the moon. At the beginning of the program, there is a choice of the size of numbers to add, with opportunity to enter your own high and low numbers.

CHILDREN- race your Moon Buggies across the moon's surface towards your rocket and lift off. The program begins by asking you to choose the size of numbers to add and your screen will look like this:-



```
Do you want numbers between

      1) 0 and 10
      2) 0 and 20
      3) 20 and 50
      4) 40 and 100
      5) 100 and 200
      6) 100 and 500
      7) 500 and 1000
       or 8) do you wish to enter your own high
      and low numbers

      press the correct number
```

Both you and your friend will be asked your names and you must type them in. Remember to press the ENTER key after each name. In order to see who goes first, dice will be rolled. Now the race will be on to see who reaches the rocket first but you must answer your addition sums correctly. During the game, your screen will look like this:-

```
Elizabeth your turn
260 + 293
? ■
```

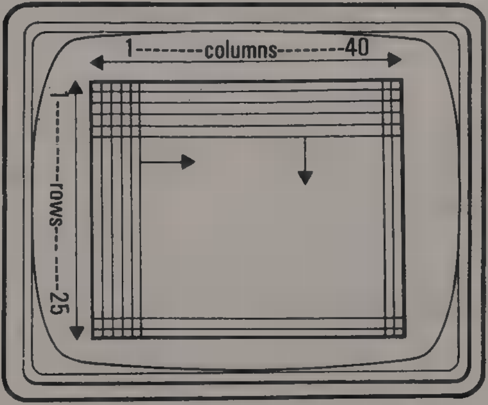
TYPING TIP

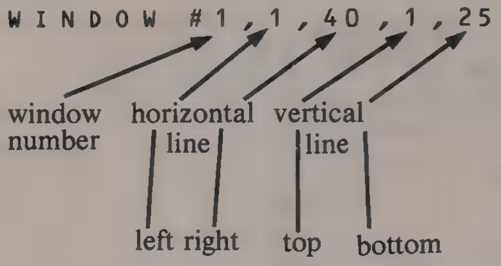
Be careful at line 140 and the variable l (the small alphabetical letter L and not 1 (one)). This occurs at frequent intervals throughout the listing. Later lo (small letters L and O, not the number ten) is used as a variable.

PROGRAMMING HINT - `WINDOWS`

The user can select up to eight text windows for use in a program. These windows can then be used for entering text. In this program three windows have been used and stated in lines 30, 35 and 40. Notice that each window is given a number - `WINDOW #1` or `WINDOW #2` etc. The next four numbers define the outline of the WINDOW.

For example, in `WINDOW #1,1,40,1,25 :-`





Windows can also overlap.

```
WINDOW #2,23,40,15,24
```

Can you work out where window #3 is according to the statement at line 40? It must also be remembered that when reference is made to any of the windows that have been specified that #1 or #2 or #3 must be put with the command. For instance, to put text in `WINDOW #2` would require `PRINT` #2"..." or to clear the window CLS #2.

```
1 REM moon-buggy
10 z$ = CHR$(143)+CHR$(143)+CHR$(143)+CHR$(143)+CH
R$(143) : x$ = CHR$(143)+CHR$(143)+CHR$(143)+CHR$(
143)
11 y$ = CHR$(32)+CHR$(32)+CHR$(32)+CHR$(32)+CHR$(3
2)+CHR$(32)+CHR$(32)+CHR$(32)+CHR$(32)+CHR$(32)
20 PEN 0 : INK 0,0 : PEN 1 : INK 1,18 : PEN 2 : IN
K 2,6 : PEN 3 : INK 3,26
30 WINDOW #1,1,40,1,25
35 WINDOW #2,23,40,15,24
40 WINDOW #3,1,17,15,24
50 PAPER #1,0 : PAPER #2,0 : PAPER #3,0
60 CLS #1 : GOSUB 800 : GOSUB 820 : GOSUB 840
65 PEN #1,2 : LOCATE #1,10,2 : PRINT #1,"M O O N
 B U G G Y" : LOCATE #1,7,6 : PRINT #1,"A  GAME  F
OR  TWO  PLAYERS"
67 GOSUB 850
69 CLS #1 : PEN #1,3 : LOCATE #1,7,2 : PRINT #1,"D
o you want numbers between " : LOCATE #1,7,4 : PRI
NT #1,"1) 0 and 10"
70 LOCATE #1,7,6 : PRINT #1,"2) 0 and 20" : LOCATE
 #1,7,8 : PRINT #1,"3) 20 AND 50" : LOCATE #1,7,10
 : PRINT #1,"4) 40 and 100"
71 LOCATE #1,7,12 : PRINT #1,"5) 100 and 200" : LO
CATE #1,7,14 : PRINT #1,"6) 100 and 500" : LOCATE
#1,7,16 : PRINT #1,"7) 500 and 1000"
72 LOCATE #1,3,18 : PRINT #1,"or  8) do you wish t
```

```
o enter your own    high and low numbers?" : PEN #
1,2 : LOCATE #1,7,21 : PRINT #1,"Press the correct
 number"
73 a$ = INKEY$ : IF a$ = "" THEN 73
74 IF a$ = "8" THEN GOSUB 1200 : GOTO 83
75 IF a$ = "1" THEN bm = 11 : bn = 0 : GOTO 83
76 IF a$ = "2" THEN bm = 21 : bn = 0 : GOTO 83
77 IF a$ = "3" THEN bm = 31 : bn = 20 : GOTO 83
78 IF a$ = "4" THEN bm = 61 : bn = 40 : GOTO 83
79 IF a$ = "5" THEN bm = 101 : bn = 100 : GOTO 83
80 IF a$ = "6" THEN bm = 401 : bn = 100 : GOTO 83
81 IF a$ = "7" THEN bm = 501 : bn = 500 : GOTO 83
82 LOCATE #1,7,24 : PRINT #1,"I said a number betw
een 1 and 8" : GOSUB 850 : GOTO 69
83 CLS #1 : GOSUB 800 : GOSUB 820 : GOSUB 840 : a
= 1 : GOSUB 600
85 LOCATE #1,3,2 : PRINT #1,"What is your name" :
PRINT #1 : INPUT #1,none$
90 PRINT #1 : PRINT #1,none$;",your buggy will be
green" : GOSUB 850
100 CLS #1 : CLS #3 : GOSUB 800 : GOSUB 820 : GOSU
B 840 : b = 1 : GOSUB 500
115 LOCATE #1,3,2 : PEN #1,2 : PRINT #1,"What is y
our name" : PRINT #1 : INPUT #1,ntwo$
120 PRINT #1 : PRINT #1,ntwo$;",your buggy will be
 red" : GOSUB 850
130 CLS #2 : CLS #1 : PEN #1,3 : LOCATE #1,1,5 : P
RINT #1,"Let's roll a dice to see who goes first."

135 PRINT #1,none$;",you roll first"
136 PRINT #1,"Hit any key to roll"
138 a$ = INKEY$ : IF a$ = "" THEN 138
140 l = INT(RND*7) : GOSUB 550 : PRINT #1,l : GOSU
B 850
160 CLS #1 : PRINT #1,ntwo$;",your turn"
165 PRINT #1,"Hit any key to roll"
167 a$ = INKEY$ : IF a$ = "" THEN 167
170 k = INT(RND*7) : GOSUB 550 : PRINT #1,k : GOSU
B 850
175 CLS #1 : LOCATE #1,1,5 : PRINT #1,none$;",your
 score was ";l : PRINT : PRINT : PRINT #1,ntwo$;",
your score was ";k : GOSUB 850
180 IF l = k THEN PRINT : PRINT #1,"scores equal r
oll again" : GOSUB 850 : GOTO 130
190 CLS #1 : CLS #2 : CLS #3 : GOSUB 800 : GOSUB 8
20 : GOSUB 840 : a = 0 : b = 0
200 IF l > k THEN 250
205 IF k > l THEN 300
250 LOCATE #1,1,1 : PRINT #1,none$;",your turn"
255 GOSUB 350
```

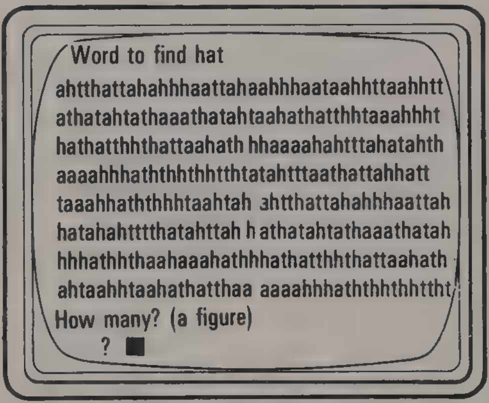
```
260 LOCATE #1,4,5 : INPUT #1,ansone
265 IF ansone <> x + y THEN 395
270 a = a + 1
271 IF a = 10 THEN GOSUB 600 : GOTO 1050
272 GOSUB 600 : GOSUB 450 : GOTO 300
300 LOCATE #1,1,1 : PRINT #1,ntwo$;",your turn"
305 GOSUB 350
310 LOCATE #1,4,5 : INPUT #1,anstwo
315 IF anstwo <> x + y THEN 392
320 b = b + 1
325 IF b = 10 THEN GOSUB 500 : GOTO 1000
330 GOSUB 500 : GOSUB 450 : GOTO 250
350 x = INT(RND*bm)+bn : y = INT(RND*bm)+bn
352 PEN #1,3
355 LOCATE #1,4,3 : PRINT #1,x;" + ";y
360 SOUND 1,71,40,6 : RETURN
392 GOSUB 400 : GOSUB 450 : GOTO 250
395 GOSUB 400 : GOSUB 450 : GOTO 300
400 LOCATE #1,4,6 : PRINT #1,"no, answer is ";x+y
: GOSUB 850 : RETURN
450 LOCATE #1,1,1 : PRINT #1,y$;y$ : LOCATE #1,4,3
 : PRINT #1,y$;y$ : LOCATE #1,4,5 : PRINT #1,y$;y$
 : LOCATE #1,4,6 : PRINT #1,y$;y$ : RETURN
500 CLS #2 : PEN #2,2 : LOCATE #2,17-b,1 : PRINT #
2,CHR$(209)CHR$(215) : LOCATE #2,17-b,2 : PRINT #2
,CHR$(209)CHR$(215)
505 LOCATE #2,13-b,3 : PRINT #2,CHR$(211)CHR$(32)C
HR$(143)CHR$(32)CHR$(209) : PRINT #2,TAB(13-b);CHR
$(211)CHR$(204)CHR$(143)CHR$(215)CHR$(209)
510 PRINT #2,TAB(12-b);CHR$(214);z$ : PRINT #2,TAB
(12-b);CHR$(143);z$ : PRINT #2,TAB(13-b);CHR$(202)
CHR$(32)CHR$(32)CHR$(32)CHR$(202)
515 RETURN
550 PEN #1,2 : FOR g = 0 TO 36 STEP 13 : LOCATE #1
,4+g,9 : PRINT #1,CHR$(214)CHR$(215) : LOCATE #1,3
+g,10 : PRINT #1,CHR$(214)CHR$(143)CHR$(143)CHR$(2
15)
555 LOCATE #1,2+g,11 : PRINT #1,CHR$(214);x$;CHR$(
215) : LOCATE #1,2+g,12 : PRINT #1,CHR$(213);x$;CH
R$(212)
560 LOCATE #1,3+g,13 : PRINT #1,CHR$(213)CHR$(143)
CHR$(143)CHR$(212) : LOCATE #1,4+g,14 : PRINT #1,C
HR$(213)CHR$(212)
565 FOR t = 1 TO 250 : NEXT t : CLS
570 FOR h = 0 TO 4 : FOR hh = 0 TO 4 : LOCATE #1,9
+h+g,10+hh : PRINT #1,CHR$(143) : NEXT hh : NEXT h
 : FOR t = 1 TO 250 : NEXT t
575 IF g = 26 THEN 580
577 CLS #1 : NEXT g
580 PEN #1,3 : LOCATE #1,36,12 : RETURN
```

```
600 CLS #3 : PEN #3,1 : LOCATE #3,a,1 : PRINT #3,T
AB(a);CHR$(214)CHR$(211) : PRINT #3,TAB(a);CHR$(21
4)CHR$(211)
610 PRINT #3,TAB(a+1);CHR$(211)CHR$(32)CHR$(143)CH
R$(32)CHR$(209) : PRINT #3,TAB(a+1);CHR$(211)CHR$(
214)CHR$(143)CHR$(205)CHR$(209)
615 PRINT #3,TAB(a+1);z$;CHR$(215) : PRINT #3,TAB(
a+1);z$;CHR$(143) : PRINT #3,TAB(a+1);CHR$(202)CHR
$(32)CHR$(32)CHR$(32)CHR$(202)
620 RETURN
800 PEN #1,1 : PLOT 0,176 : DRAW 45,224 : DRAW 75,
224 : DRAW 135,176 : DRAW 195,176 : DRAW 315,290 :
 DRAW 360,290: DRAW 405,240 : DRAW 435,240 : DRAW
465,272 : DRAW 495,272 : DRAW 535,208 : DRAW 640,2
08
810 RETURN
820 PEN #1,3 : LOCATE #1,20,12 : PRINT #1,CHR$(149
) : LOCATE #1,19,13 : PRINT #1,CHR$(214)CHR$(143)C
HR$(215)
825 FOR mm = 0 TO 2 : FOR mn = 0 TO 8 : LOCATE #1,
19+mm,14+mn : PRINT #1,CHR$(143) : NEXT mn : NEXT
mm
830 LOCATE #1,18,18 : PRINT #1,CHR$(214) : LOCATE
#1,22,18 : PRINT #1,CHR$(215) : FOR mp = 0 TO 3 :
LOCATE #1,18,19+mp : PRINT #1,CHR$(143) : LOCATE #
1,22,19+mp : PRINT #1,CHR$(143) : NEXT mp : RETURN

840 PEN #1,2 : LOCATE #1,5,3 : PRINT #1,CHR$(238)
: LOCATE #1,22,3 : PRINT #1,CHR$(238) : LOCATE #1,
31,3 : PRINT #1,CHR$(238) : LOCATE #1,14,4 : PRINT
 #1,CHR$(238) : LOCATE #1,10,9 : PRINT #1,CHR$(238
) : RETURN
850 FOR t = 1 TO 3000 : NEXT t : RETURN
1000 GOSUB 450 : LOCATE #1,7,6 : PRINT #1,"WHOOPEE
..";ntwo$;" you won the race" : GOSUB 1100 : END
1050 GOSUB 450 : LOCATE #1,7,6 : PRINT #1,"GREAT..
.";none$;" you won the race" : GOSUB 1100 : END
1100 FOR tb = 1 TO 30 : BORDER INT(RND*27) : SOUND
 1,338,20,6 : FOR t = 1 TO 300 : NEXT t : NEXT tb
: RETURN
1200 CLS #1 : LOCATE #1,3,3 : PRINT #1,"What is yo
ur high number?" : LOCATE #1,3,5 : INPUT #1,hi
1205 LOCATE #1,3,7 : PRINT #1,"What is your low nu
mber?" : LOCATE #1,3,9 : INPUT #1,lo
1210 bm = hi - lo : bn = lo : RETURN
```

SEARCH

PARENTS- A novel and colourful program helping language development by spotting a word from a screen full of letters from that word. Children of all ages will enjoy finding the number of times the word occurs.

CHILDREN - how many times can you spot a word from a screen full of letters? Compete with your friends to see who can spot correctly. The program begins by explaining how to spot the word and then continues by giving you the choice of either typing your own word of four letters or under, or to use a word from the computer's dictionary, which the computer has picked randomly. Your screen will be full of colourful letters and will look like this:-



```
Word to find hat
ahtthattahahhhaattahaahhhaataahhttaahhtt
athatahtathaaathatahtaahathatthhtaaahhht
hathatthhthattaahath hhaaaahahtttahatahth
aaaahhhaththhthhtthtatahtttaathattahhatt
taaahhaththhhtaahtah ahtthattahahhhaattah
hatahahttttthatahttah h athatahtathaaathatah
hhhathhthaahaaahathhhathatthhthattaahath
ahtaahhtaahathatthaa aaaahhhaththhthhttht
How many? (a figure)
   ? ■
```

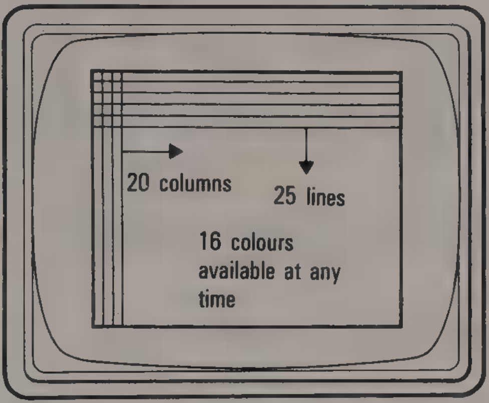
You must count the number of times that the word appears and then type that figure in, pressing ENTER after you have done so.

TYPING TIP- if you require a different set of words then erase line 430 and type in 30 more words. You may make the words easier or harder but they must be of four letters or less.

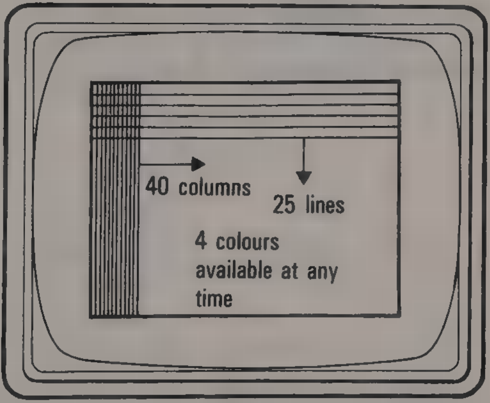
PROGRAMMING HINT - `MODE 0` `MODE 1` `MODE 2`

Your Amstrad Computer can be programmed in one of three `MODE`s. The `MODE` affects the number of columns across the screen and also the number of colours available. The three diagrams show the number of columns and lines for each mode, together with the number of colours available.

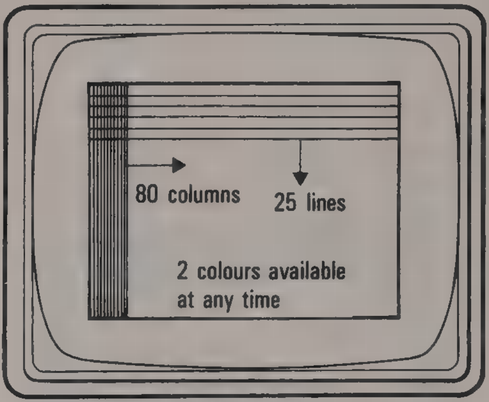
MODE 0



MODE 1



MODE 2



When the computer is switched on it is in `MODE 1`, known as 'standard' or 'default' mode. These three short programs demonstrate the `MODE` differences.

Type them out and try them:-

```
10 MODE 1

20 PRINT "Welcome folks"

30 GOTO 20
```

Run this program stopping it with the **ESC** key. Now alter line 10 so that it first reads: `10 MODE 2` and then `10 MODE 0`. Run the program with each of these changes and you will see how the size of text alters depending on the mode. Graphics will also differ in a similar way.

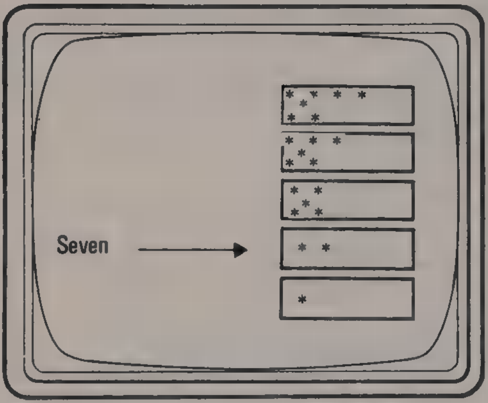
```
1 REM search
2 DIM z$(29)
3 MODE 0
5 PEN 0 : INK 0,0 : PEN 1 : INK 1,1 : PEN 2 : INK
2,6 : PEN 3 : INK 3,7 : PEN 4 : INK 4,18 : PEN 5 :
 INK 5,24 : PEN 6 : INK 6,15 : PEN 7 : INK 7,13
30 GOSUB 300
35 IF b$ = "2" THEN GOSUB 400
40 BORDER 13 : PAPER 7
```

```
45 CLS
48 PEN 0 : PRINT "Word to find ";word$
50 p$ = ""
70 f = LEN(word$)
80 FOR r = 1 TO 48 * f
90 m = INT(RND*f)+1
100 h$ = MID$(word$,m,1)
105 PEN INT(RND*7)
110 PRINT h$;" ";
120 p$ = RIGHT$(p$,f-1)+h$
130 IF p$ = word$ THEN n = n+ 1
140 NEXT r
150 PRINT "How many?(a figure)"
155 INPUT ans
160 IF ans = n THEN PRINT "Good" ELSE PRINT "No, a
nswer";n
165 END
300 PAPER 0 : PEN 4 : LOCATE 5,3 : PRINT "WORD---S
EARCH" : PRINT : PEN 2 : PRINT "This is a game to
  spot a certain word on the screen from a random
array of     letters taken from  that word."
310 PRINT : PEN 2 : PRINT "For instance"; : PEN 5
: PRINT " cat" : PRINT : PRINT "ctactaccattac" : P
RINT : PEN 2 : PRINT "appears once" : PEN 7 : LOCA
TE 8,15 : PRINT CHR$(208)CHR$(208)CHR$(208)
320 PEN 7 : PRINT : PRINT : PRINT : PRINT "Hit any
 key"
330 a$ = INKEY$ : IF a$ = "" THEN 330
340 CLS : PEN 2 : PRINT : PRINT "Do you want to "
: PRINT : PRINT "1) enter your word" : PRINT : PRI
NT "or" : PRINT : PRINT "2) use a computer      wor
d"
350 PRINT : PRINT : PRINT "Press 1 or 2"
360 b$ = INKEY$ : IF b$ = "" THEN 360
365 IF b$ = "1" THEN PRINT : PRINT "Enter a word o
f fourletters or less" : INPUT word$ : RETURN
370 IF b$ = "2" THEN RETURN
375 PRINT "I said 1 or 2" : FOR t = 1 TO 2500 : NE
XT t : CLS : GOTO 300
400 RESTORE : FOR w = 0 TO 29
405 READ z$(w) : NEXT w
410 x = INT(RND*30)
415 word$ = "" : word$ = word$ + z$(x)
420 RETURN
430 DATA mad,rub,rat,chum,hate,mark,beg,ship,soil,
rain,tap,net,bit,than,home,hat,wet,wait,trip,move,
son,sun,met,top,left.head,girl,boy,toy,bin
```

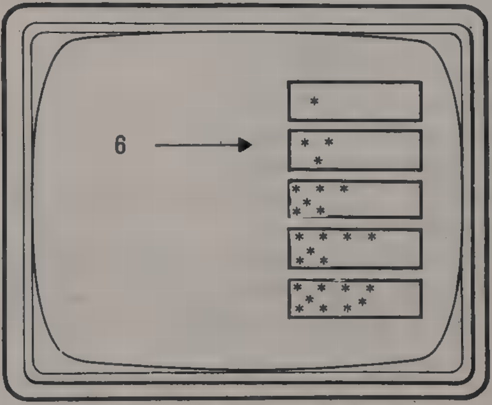
MATCH

PARENTS- this is a program for a young child to practice matching numbers as words or figures with a number pattern. On the right of the screen are five patterns of stars. The number to be matched with the stars appears on the left. The child has to press the space bar when he thinks that the figure or word corresponds to the pattern.

The screen will look like this:-



or

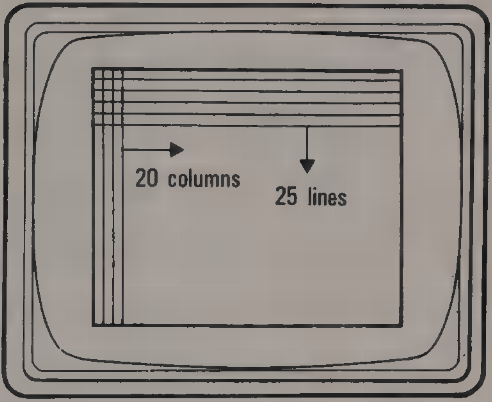


The program allows for the arrow to go through the sequence of patterns three times. If there has been no input, then the child will be shown the correct answer. Similarly, if the child gives a wrong answer, he will be shown the correct answer.

CHILDREN- numbers are fun! Try to match the stars with the number. Press the SPACE BAR when they match.

PROGRAMMING HINT - `MODE 0`

This program has been written in `MODE 0` (line 50) so that the characters are large and clear. Mode 0 divides the screen into 20 characters horizontally and 25 lines vertically.



```
1 REM match
10 DIM b$(10)
11 g$ = "* * * *" : h$ = "*    *" : f$ = "* * *" :
k$ = "* *"
12 a = 12
20 PEN 0 : INK 0,0 : PEN 1 : INK 1,24 : PEN 2 : IN
K 2,7 : PEN 3 : INK 3,26
25 MODE 0 : BORDER 10 : PAPER 0 : PEN 1 : CLS : LO
CATE 3,10 : PRINT "M A T C H I N G"
27 FOR k = 1 TO 10 : BORDER INT(RND*27) : SOUND 1,
358,20,7 : FOR t = 1 TO 200 : NEXT t : NEXT k
28 LOCATE 1,13 : PRINT "Do you want to      match
:" : PRINT : PRINT "1) words?" : PRINT : PRINT "2)
 figures?" : PRINT : INPUT ans
29 IF ans = 1 THEN RESTORE 300 : GOTO 40
30 IF ans = 2 THEN RESTORE 320 : GOTO 40
32 PRINT "Incorrect number." : FOR t = 1 TO 1500 :
 NEXT t : GOTO 25
40 FOR m = 0 TO 10 : READ b$(m) : NEXT m
50 MODE 0 : BORDER 0 : PAPER 0 : PEN 2 : CLS
```

```
55 c = INT(RND*10)+1
60 d = INT(RND*10)+1
65 e = INT(RND*10)+1
70 f = INT(RND*10)+1
71 g = INT(RND*10)+1
72 IF c = d OR c = e OR c = f OR c = g THEN 55
74 IF d = e OR d = f OR d = g THEN 60
76 IF e = f OR e = g THEN 65
77 IF f = g THEN 70
80 h = INT(RND*5)+1
82 ON h GOTO 90,92,94,96
90 h = c : r = 1 : GOTO 100
92 h = d : r = 2 : GOTO 100
94 h = e : r = 3 : GOTO 100
96 h = f : r = 4 : GOTO 100
98 h = g : r = 5 : GOTO 100
100 LOCATE a,2 : ON c GOSUB 250,248,246,244,240,23
5,232,230,228,226
 105 LOCATE a,7 : ON d GOSUB 250,248,246,244,240,23
5,232,230,228,226
 110 LOCATE a,12 : ON e GOSUB 250,248,246,244,240,2
35,232,230,228,226
 115 LOCATE a,17 : ON f GOSUB 250,248,246,244,240,2
35,232,230,228,226
 120 LOCATE a,22 : ON g GOSUB 250,248,246,244,240,2
35,232,230,228,226
 130 GOSUB 200
 145 FOR y = 1 TO 3
 150 PEN 1 : FOR p = 3 TO 23 STEP 5
 155 LOCATE 1,p : PRINT b$(h) : PEN 3 : LOCATE 7,p
 : GOSUB 450
 160 FOR t = 1 TO 1000 : NEXT t
 165 a$ = INKEY$ : IF a$ = "" THEN 175
 170 GOTO 350
 175 PEN 1 : LOCATE 1,p : PRINT "        "
 178 a$ = " "
 180 NEXT p
 185 NEXT y
 190 GOTO 500
 200 FOR n = 8 TO 328 STEP 80
 202 PLOT 345,n,3 : DRAW 585,n,3 : PLOT 345,n+64 :
 DRAW 585,n+64
 204 PLOT 345,n : DRAW 345,n+64 : PLOT 585,n : DRAW
  585,n+64
  205 NEXT n
  210 RETURN
  226 PRINT g$ : PRINT TAB(a+1);h$ : PRINT TAB(a);g$
  : RETURN
  228 PRINT g$ : PRINT TAB(a+1);h$ : PRINT TAB(a);f$
  : RETURN
```

```
230 PRINT g$ : PRINT TAB(a+1);h$ : PRINT TAB(a);k$
 : RETURN
232 PRINT g$ : PRINT TAB(a+1);"*" : PRINT TAB(a);k
$ : RETURN
235 PRINT f$ : PRINT TAB(a+1);"*" : PRINT TAB(a);k
$ : RETURN
240 PRINT k$
241 PRINT TAB(a+1);"*"
242 PRINT TAB(a);k$ : RETURN
244 PRINT k$ : PRINT TAB(a+1);"*" : PRINT TAB(a);"
*" : RETURN
246 PRINT k$
247 PRINT TAB(a+1);"*" : RETURN
248 PRINT k$ : RETURN
250 PRINT "*" : RETURN
300 DATA numbers,one,two,three,four,five,six,seven
,eight,nine,ten
320 DATA figures,1,2,3,4,5,6,7,8,9,10
350 IF r = 1 AND p = 3 THEN 400
355 IF r = 2 AND p = 8 THEN 400
360 IF r = 3 AND p = 13 THEN 400
365 IF r = 4 AND p = 18 THEN 400
370 IF r = 5 AND p = 23 THEN 400
380 PEN 1 : LOCATE 1,p+1 : PRINT "No" : FOR t = 1
TO 1000 : NEXT t
383 LOCATE 1,p : PRINT "          " : LOCATE 1,p+1
 : PRINT "     "
385 GOTO 500
400 PEN 2 : LOCATE 1,p+1 : PRINT "good" : FOR x =
1 TO 10 : BORDER INT(RND*27) : SOUND 1,30,20,7 : F
OR t = 1 TO 250 : NEXT t : NEXT x
410 GOTO 50
450 FOR w = 1 TO 3 : PRINT CHR$(154); : SOUND 1,28
63,20,7 : FOR t = 1 TO 200 : NEXT t : NEXT w : PRI
NT CHR$(243) : RETURN
500 IF r = 1 THEN p = 3 : GOTO 520
502 IF r = 2 THEN p = 8 : GOTO 520
504 IF r = 3 THEN p = 13 : GOTO 520
506 IF r = 4 THEN p = 18 : GOTO 520
508 IF r = 5 THEN p = 23 : GOTO 520
520 FOR z = 1 TO 5 : PEN 1 : LOCATE 1,p : PRINT b$
(h) : PEN 3 : LOCATE 7,p : GOSUB 450
525 SOUND 1,301,20 : FOR t = 1 TO 200 : NEXT t : L
OCATE 1,p : PRINT "          " : FOR t = 1 TO 200
: NEXT t : NEXT z
530 GOTO 50
```

PARLEZ-VOUS FRANCAIS?

Bonjour La Maison French

Three novel programs to reinforce early French learning and vocabulary, highlighted with good clear graphics. A total of over 100 French words are used in the three programs.

N.B. During these programs the accents and cedillas have been omitted.

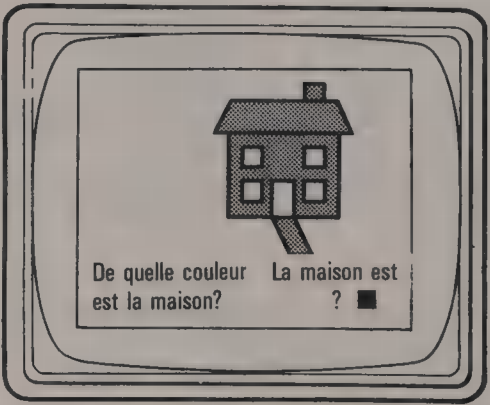
BONJOUR

PARENTS- Bonjour is a very simple program designed to give repetition and consolidation practice in numbers to 20 and the colours red, blue, green, yellow, black, white and orange in French. This is done by a question and answer routine with helpful graphics.

CHILDREN- are you learning French at school or practising French for a holiday? If so, this will be a helpful program for you. The computer will ask you either:-

`"De quelle couleur est la maison?"`

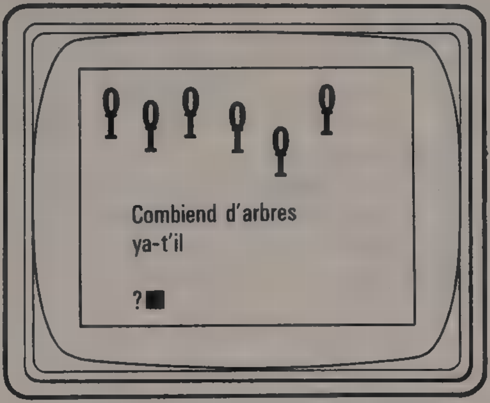
or `"Combien d'arbres y a-t-il?"`



De quelle couleur est la maison?

La maison est
? ■

or



```
Combiend d'arbres
ya-t'il

?
```

Type in your answer and remember to press the ENTER key after it.

For example:-

blanche ENTER

verte ENTER

six ENTER

douze ENTER

A correct answer puts "`bien`" on the screen. If your answer is wrong, you will be shown the correct answer. It will look like this:-

```
 "non, la maison est ....."
or "non"

 "Il y en a ....."
```

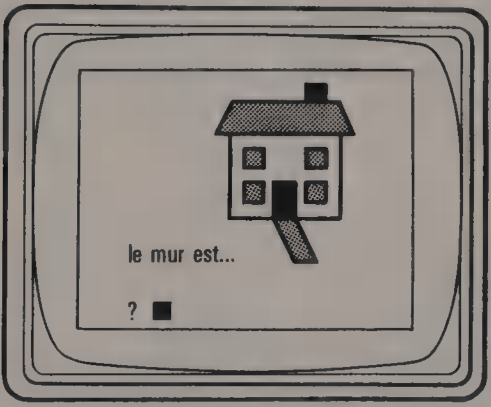
You must remember that because house takes the feminine gender, then the colours must also take the feminine gender.

```
1 REM bonjour
3 DIM d$(20)
5 MODE 0
10 PEN 0 : INK 0,0 : PEN 1 : INK 1,26 : PEN 2 : IN
K 2,6 : PEN 3 : INK 3,9 : PEN 4 : INK 4,2 : PEN 5
: INK 5,24 : PEN 6 : INK 6,15 : PEN 7 : INK 7,13 :
 PEN 8 : INK 8,20
15 a$ = CHR$(143)+CHR$(143)+CHR$(143)+CHR$(143)+CH
R$(143) : b$ = CHR$(143)+CHR$(143)+CHR$(143)+CHR$(
143)+CHR$(143)+CHR$(143)+CHR$(143)
20 c$(0) = "noire" : c$(1) = "blanche" : c$(2) = "
rouge" : c$(3) = "verte" : c$(4) = "bleue" : c$(5)
 = "jaune" : c$(6) = "orange"
25 FOR k = 0 TO 20 : READ d$(k) : NEXT k
30 BORDER 14 : PAPER 0
31 FOR bb = 1 TO 3
32 CLS : PEN INT(RND*8)+1
34 LOCATE 4,10 : PRINT "B O N J O U R"
36 GOSUB 420 : NEXT bb : GOSUB 400
50 b = INT(RND*2)+1
55 ON b GOTO 100,500
100 a = INT(RND*7)
130 BORDER 13 : PAPER 7 : CLS
140 GOSUB 300
150 PEN 0 : LOCATE 1,19 : PRINT "De quelle couleur
   est la maison?"
160 LOCATE 1,22 : PRINT "La maison est"
165 LOCATE 8,23 : INPUT ans$
170 IF ans$ = c$(a) THEN 200
180 PRINT "Non, la maison" : PRINT TAB(8);"est ";c
$(a)
185 GOSUB 420 : GOTO 50
200 PRINT : PRINT "bien" : GOSUB 400 : GOTO 50
300 PEN a : LOCATE 15,2 : PRINT CHR$(133) : LOCATE
 15,3 : PRINT CHR$(133)
305 LOCATE 10,4 : PRINT CHR$(214);a$;CHR$(215)
310 LOCATE 9,5 : PRINT CHR$(214);a$;CHR$(143)CHR$(
143)CHR$(215)
315 FOR z = 0 TO 7 : LOCATE 10,6+z : PRINT b$ : NE
XT z
320 PEN 8 : FOR y = 0 TO 1 : LOCATE 11,7+y : PRINT
 CHR$(143) : LOCATE 15,7+y : PRINT CHR$(143) : LOC
ATE 11,10+y : PRINT CHR$(143) : LOCATE 15,10+y : P
RINT CHR$(143) : NEXT y
330 FOR x = 0 TO 3 : LOCATE 13,10+x : PRINT CHR$(1
43) : NEXT x
340 PEN a : FOR w = 0 TO 3 : LOCATE 13+w,14+w : PR
INT CHR$(213)CHR$(215) : NEXT w
350 RETURN
400 FOR m = 1 TO 10 : SOUND 1,1517,20,7 : FOR t =
1 TO 250 : NEXT t : NEXT m :  RETURN
420 FOR n = 7 TO 0 STEP -1 : SOUND 1,30,20,n,0,0,1
5 : FOR t = 1 TO 200 : NEXT t : NEXT n : RETURN
450 DATA numbers,un,deux,trois,quatre,cinq,six,sep
t,huit,neuf,dix,onze,douze,treize,quatorze,quinze,
seize
455 DATA dix-sept,dix-huit,dix-neuf,vingt
500 BORDER 22 : PAPER 8 : CLS
510 h = INT(RND*20)+1
525 FOR f = 1 TO h : PEN INT(RND*8) : p = INT(RND*
15)+1 : LOCATE f,p : PRINT CHR$(202) : LOCATE f,p+
1 : PRINT CHR$(149) : NEXT f
530 PEN 0 : LOCATE 1,17 : PRINT "Combien d'arbres"
 : PRINT "y a-t'il?"
535 PRINT : INPUT n$
540 IF n$ = d$(h) THEN PRINT "bien" : PRINT "Il y
en a ";n$ : PRINT "arbres." : GOSUB 400 : GOTO 50

550 PRINT "non" : PRINT "Il y en a ";d$(h) : PRINT
 "arbres." : GOSUB 420 : GOTO 50
```

LA MAISON

PARENTS- La Maison is also a program that involves selecting the correct colour to complete a sentence about different parts of a house. Obviously, a wider vocabulary is required for this program, and a knowledge of masculine and feminine genders BUT it is still a program designed for beginners!

CHILDREN- in this program you are asked to complete a sentence about the colour of different parts of a house.



```
le mur est...

? ■
```

You will have to think carefully before you type in your answer because some words are masculine and some feminine, and the spelling of the colours alters accordingly. Remember, as well, to press the ENTER key when you are sure that you have the correct answer.

If your answer is correct, "bien" will be shown on the screen. If your answer is wrong, you will be told the correct answer.

For example:-

```
"le sentier est ....."

"verte"

"non, le sentier est vert"
```

Don't forget that all the accents and cedillas have been left out of these programs.

```
1 REM la maison
5 MODE 0
10 PEN 0 : INK 0,0 : PEN 1 : INK 1,26 : PEN 2 : IN
K 2,6 : PEN 3 : INK 3,18 : PEN 4 : INK 4,2 : PEN 5
 : INK 5,24 : PEN 6 : INK 6,15 : PEN 7 : INK 7,13

15 a$ = CHR$(143)+CHR$(143)+CHR$(143)+CHR$(143)+CH
R$(143) : b$ = CHR$(143)+CHR$(143)+CHR$(143)+CHR$(
143)+CHR$(143)+CHR$(143)+CHR$(143)
20 c$(0) = "noire" : c$(1) = "blanche" : c$(2) = "
rouge" : c$(3) = "verte" : c$(4) = "bleue" : c$(5)
 = "jaune" : c$(6) = "orange"
25 f$(0) = "noir" : f$(1) = "blanc" : f$(2) = "rou
ge" : f$(3) = "vert" : f$(4) = "bleu" : f$(5) = "j
aune" : f$(6) = "orange"
100 a = INT(RND*7)
102 b = INT(RND*7)
104 c = INT(RND*7)
106 d = INT(RND*7)
108 e = INT(RND*7)
110 f = INT(RND*7)
112 IF c = d THEN 104
114 IF e = c THEN 106
130 BORDER 3 : PAPER 7 : CLS
140 GOSUB 300
150 r = INT(RND*6)+1
151 ON r GOTO 152,154,156,158,160,162
152 n$ = "la cheminee " : g = a : GOTO 180
```

```
154 n$ = "le toit " : g = b : GOTO 500
156 n$ = "le mur " : g = c : GOTO 500
158 n$ = "la fenetre " : g = d : GOTO 180
160 n$ = "le sentier " : g = f : GOTO 500
162 n$ = "la porte " : g = e
180 PEN 0 : LOCATE 2,19 : PRINT n$;"est..."
185 LOCATE 10,21 : INPUT z$
190 IF z$ = c$(g) THEN 600
200 LOCATE 2,23 : PRINT "non,";n$"
205 PRINT TAB(2);"est ";c$(g) : GOTO 400
300 PEN a : LOCATE 15,2 : PRINT CHR$(133) : LOCATE
 15,3 : PRINT CHR$(133)
305 PEN b : LOCATE 10,4 : PRINT CHR$(214);a$;CHR$(
215)
310 PEN b : LOCATE 9,5 : PRINT CHR$(214);a$;CHR$(1
43)CHR$(143)CHR$(215)
315 PEN c : FOR z = 0 TO 7 : LOCATE 10,6+z : PRINT
 b$ : NEXT z
320 PEN d : FOR y = 0 TO 1 : LOCATE 11,7+y : PRINT
 CHR$(143) : LOCATE 15,7+y : PRINT CHR$(143) : LOC
ATE 11,10+y : PRINT CHR$(143) : LOCATE 15,10+y : P
RINT CHR$(143) : NEXT y
330 PEN e : FOR x = 0 TO 3 : LOCATE 13,10+x : PRIN
T CHR$(143) : NEXT x
340 PEN f : FOR w = 0 TO 3 : LOCATE 13+w,14+w : PR
INT CHR$(213)CHR$(215) : NEXT w
350 RETURN
400 FOR n = 7 TO 0 STEP -1
405 SOUND 1,30,20,n,0,0,15 : FOR t = 1 TO 150 : NE
XT t : NEXT n : GOTO 100
500 PEN 0 : LOCATE 2,20 : PRINT n$;"est..."
502 LOCATE 10,22 : INPUT z$
505 IF z$ = f$(g) THEN 600
510 LOCATE 2,23 : PRINT "non,";n$"
515 PRINT TAB(2);"est ";f$(g) : GOTO 400
600 LOCATE 2,24 : PRINT "bien"
605 FOR m = 1 TO 10 : SOUND 1,1517,20,7 : FOR t =
1 TO 250 : NEXT t : NEXT m
610 GOTO 100
```

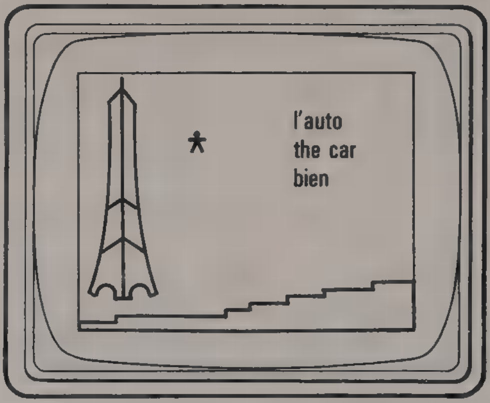
FRENCH

PARENTS- this program gives practice in many of the common words connected with home, school, days of the week, months of the year and many others.

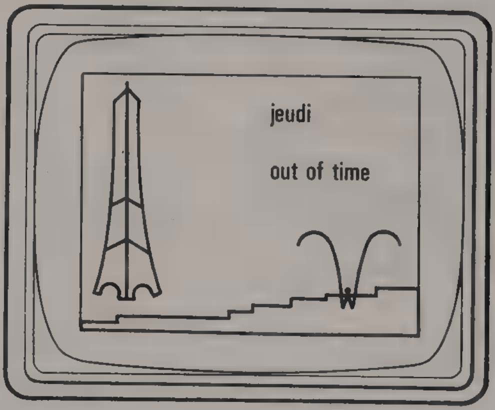
CHILDREN- can you stop the hang-glider from getting a “ducking” in the River Seine as he takes off from the Eiffel Tower? All you have to do is translate the given

French word into English. When you have typed in your English word, remember to press the ENTER key. It is a race against time!!

Your screen will look like this:-



or



BONNE CHANCE!

PROGRAMMING HINT - GRAPHICS

In many of the program listings you will see the command `CHR$( )`. Inside the bracket will be a number in the range 32 to 255, which refers to a set of character symbols that are permanently in the computer's memory. For instance, the command: PRINT CHR$(239) will give a rocket shape.

Try this short program which will give you all the character symbols on the screen:-

```
10 FOR a = 32 TO 255

20 PRINT CHR$(a)

30 FOR t = 1 TO 250 : NEXT t

40 NEXT a
```

You will find all these characters and their corresponding number in the Amstrad User Guide in Appendix 3.

```
1 REM french
10 DIM a$(61) : DIM b$(61)
12 d$ = CHR$(140)+CHR$(140)+CHR$(140) : g$ = CHR$(
143)+CHR$(143)+CHR$(143)+CHR$(143)+CHR$(143)+CHR$(
143)
15 h$ = CHR$(32)+CHR$(32)+CHR$(32)+CHR$(32)+CHR$(3
2)+CHR$(32)+CHR$(32)+CHR$(32)+CHR$(32)
20 FOR b = 0 TO 61 : READ a$(b) : READ b$(b) : NEX
T b
30 PEN 0 : INK 0,0 : PEN 1 : INK 1,26 : PEN 2 : IN
K 2,6 : PEN 3 : INK 3,2
40 BORDER 0 : PAPER 0 : CLS
45 GOSUB 400 : GOSUB 300
50 BORDER 0 : c = INT(RND*61)
55 LOCATE 20,2 : PEN 2 : PRINT a$(c)
60 GOTO 700
300 PEN 3 : LOCATE 31,22 : PRINT d$;g$ : LOCATE 24
,23 : PRINT d$;g$;g$;CHR$(143)
305 LOCATE 17,24 : PRINT d$;g$;g$;g$;CHR$(143)CHR$
(143) : LOCATE 1,25 : PRINT d$;g$;g$;g$;g$;g$;g$ :
 RETURN
400 PLOT 100,32,1 : DRAW 100,400,1 : PLOT 30,38 :
DRAW 45,88 : DRAW 60,144 : DRAW 75,224 : DRAW 82,3
04 : DRAW 87,368
405 DRAW 100,384 : DRAW 113,368 : DRAW 118,304 : D
RAW 125,224 : DRAW 140,144 : DRAW 155,88 : DRAW 17
0,38 : DRAW 163,36
```

```
410 FOR a = 1 TO 180 : DEG : PLOT 135+28*COS(a),35
+28*SIN(a) : PLOT 65+28*COS(a),35+28*SIN(a) : NEXT
 a
415 PLOT 107,34 : DRAW 100,32 : DRAW 93,34 : PLOT
30,38 : DRAW 37,36
420 PLOT 45,88 : DRAW 100,102 : DRAW 155,88 : PLOT
 60,144 : DRAW 100,160 : DRAW 140,144 : PLOT 87,36
8 : DRAW 100,376 : DRAW 113,368
430 RETURN
475 FOR t = 1 TO 550 : NEXT t : RETURN
500 DATA un homme,a man,une femme,a woman,un garco
n,a boy,une fille,a girl,un chat,a cat,un chien,a
dog,un poisson,a fish,un oiseau,a bird,un poulet,a
 chicken
505 DATA un livre,a book,la table,the table,la boi
te,the box,dans la table,in the box,sur la table,o
n the table,un stylo,a pen,une gomme,a rubber,un c
rayon,a crayon
510 DATA la salle de bains,the bathroom,la chambre
,the bedroom,le salon,the lounge,la salle a manger
,the dining room,la cuisine,the kitchen,notre mais
on,our house,votre maison,your house
515 DATA un cahier,an exercise book,un mur,a wall,
une chaise,a chair,une boite,a box,un magnetophone
,a tape recorder,un tableau,a picture,une caravane
,a caravan,une tente,a tent
520 DATA un jardin,a garden,un magasin,a shop,un s
upermarche,a supermarket
525 DATA lundi,Monday,mardi,Tuesday,mercredi,Wedne
sday,jeudi,Thursday,vendredi,Friday,samedi,Saturda
y,dimanche,Sunday
530 DATA janvier,January,fevrier,February,mars,Mar
ch,avril,April,mai,May,juin,June,juillet,July,aout
,August,septembre,September,octobre,October,novemb
re,November,decembre,December
535 DATA aujourd'hui,today,bonne anniversaire,happ
y birthday
540 DATA l'auto,the car,le pain,the bread,le bras,
the arm,la tete,the head,le pied,the foot,les yeux
,the eyes,l'oreille,the ear
700 m$ = ""
710 FOR d = 0 TO 8
720 PEN 2 : LOCATE 9+d,4 : PRINT CHR$(249) : GOSUB
 980
730 datum = INT(TIME/300)
740 GOTO 760
750 LOCATE 9+d,4 : PRINT CHR$(32)
752 IF d = 8 THEN 850
755 NEXT d
760 f$ = INKEY$
```

```
770 IF f$ = "" THEN 790
780 IF ASC(f$) = 13 THEN 900
790 m$ = m$ + f$
800 PEN 3 : LOCATE 20,4 : PRINT m$
810 ticker = ((TIME/300)-datum)
820 IF ticker >1 THEN 750
830 GOTO 760
850 FOR d = 0 TO 16
852 PEN 2 : LOCATE 18+d,5+d : PRINT CHR$(249) : GO
SUB 980
854 datum = INT(TIME/300)
856 GOTO 860
857 LOCATE 18+d,5+d : PRINT CHR$(32)
858 IF d = 16 THEN LOCATE 34,21 : PEN 2 : PRINT CH
R$(249) : GOTO 950
859 NEXT d
860 f$ = INKEY$
862 IF f$ = "" THEN 865
863 IF ASC(f$) = 13 THEN 900
865 m$ = m$ + f$
868 PEN 3 : LOCATE 20,4 : PRINT m$
870 ticker = ((TIME/300)-datum)
872 IF ticker >1 THEN 857
875 GOTO 860
900 IF m$ <> b$(c) THEN 930
902 LOCATE 27,7 : PRINT "bien"
905 FOR w = 1 TO 15 : BORDER INT(RND*27) : GOSUB 9
80 : GOSUB 990 : NEXT w
910 GOSUB 1000 : GOSUB 300 : GOTO 50
930 LOCATE 20,7 : PRINT "non"
935 LOCATE 20,9 : PRINT "the answer is"
937 LOCATE 20,10 : PRINT b$(c) : FOR t = 1 TO 3000
 : NEXT t : GOSUB 1000 : GOSUB 300 : GOTO 50
950 LOCATE 20,11 : PRINT "out of time" : SOUND 1,6
0,20,7
955 PEN 1 : FOR p = 0 TO 3 : LOCATE 33,22-p : PRIN
T CHR$(144) : LOCATE 35,22-p : PRINT CHR$(144) : G
OSUB 980 : GOSUB 990 :   NEXT p
960 FOR p = 0 TO 1 : LOCATE 36+p,18 : PRINT CHR$(1
44) : LOCATE 32-p,18 : PRINT CHR$(144) : GOSUB 980
 : GOSUB 990 : NEXT p
965 FOR p = 0 TO 1 : LOCATE 30,19+p : PRINT CHR$(1
44) : LOCATE 38,19+p : PRINT CHR$(144) : GOSUB 980
 : GOSUB 990 : NEXT p
970 GOSUB 1000 : GOSUB 300 : GOTO 50
980 SOUND 1,60,20,7 : RETURN
990 FOR t = 1 TO 200 : NEXT t : RETURN
1000 FOR w = 1 TO 21 : LOCATE 12,1+w : PRINT h$;h$
;h$ : NEXT w : RETURN
```

DIVISION

PARENTS- the aim of this program is to give practice in the division tables using numbers between 0 and 20. Speed is an important factor and the children are timed whilst they achieve ten correct answers as the car passes the traffic lights. At the beginning of the program there is a choice of difficulty either:-

a) easy

b) harder

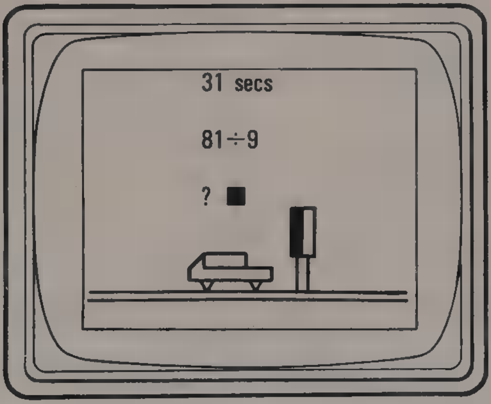
c) very hard

The easy questions are numbers between 1 and 100, for example 90 ÷ 10 or 56 ÷ 7. The harder questions use one number between 10 and 200 divided by a number between 1 and 10, for example 160 ÷ 10. The very hard questions use two numbers between 10 and 400, for example 260 ÷ 13.

CHILDREN- will your car pass the traffic lights? Speed and accuracy are important as you answer these division questions. The computer will time you for ten correct answers, so why not test your skill against a friend's time. The computer will first ask you how hard you want your questions:-

> The easy questions, which are choice (a), will give you two numbers between 1 and 100, for example 90 ÷ 10 or 56 ÷ 7. The harder questions, which are choice (b), will give you one number bewteen 10 and 200, divided by a number between 1 and 10, for example 160 ÷ 10. The very hard questions, which are choice (c), will use numbers between 10 and 400, for example 260 ÷ 13.

Your screen will look like this this:-

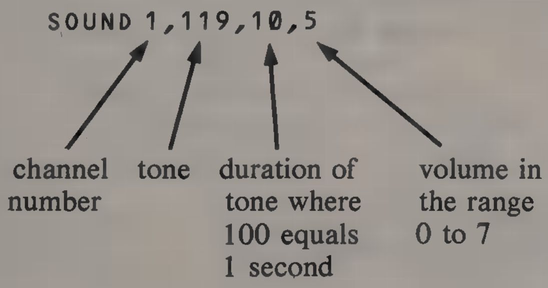


```
31 secs

81÷9

? ■
```

A pencil and paper will help you with this program. You must always remember to press the ENTER key as soon as you have typed your answer into the computer. Don't waste time as every second counts.

PROGRAMMING HINT - MUSIC

Simple music can be programmed very easily into your Amstrad Computer. Look at the subroutine at line 550. This line gives two bleeps for note C.



```
SOUND 1,119,10,5
```

channel number
tone
duration of tone where 100 equals 1 second
volume in the range 0 to 7

Try this program:-

```
10 SOUND 1,478,100,7
```

for a simple bleep or this for ten random bleeps:-

```
5 FOR a = 1 TO 10

10 SOUND 1,INT(RND*3822)+1,100,7

15 FOR t = 1 TO 200 : NEXT t

20 NEXT a
```

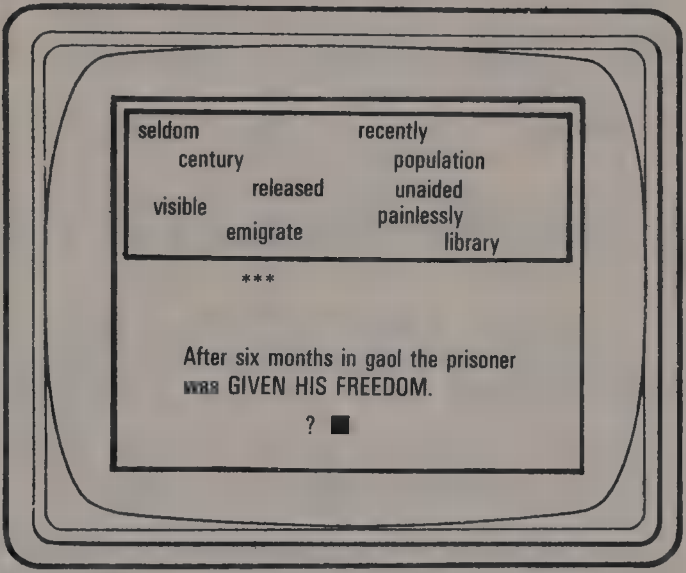
```
1 REM division
10 MODE 0
20 BORDER 0 : PAPER 0 : INK 0,0 : GOSUB 500 : GOSU
B 510 : x = 0 : z = 6 : GOSUB 530
30 PEN 1 : INK 1,6 : LOCATE 7,2 : PRINT "DIVISION"
 : LOCATE 1,4 : PRINT "Will the car pass   the tra
ffic lights?"
40 FOR t = 1 TO 3000 : NEXT t
50 BORDER 9 : PAPER 0 : INK 0,22
60 CLS : PEN 1 : INK 1,6 : LOCATE 2,4 : PRINT "Wha
t is your name?"
70 LOCATE 2,6 : INPUT name$
80 LOCATE 2,8 : PEN 2 : INK 2,10 : PRINT "Hello ";
name$
90 LOCATE 1,10 : PEN 1 : PRINT "Let's test your
  division against theclock?"
100 PRINT : PEN 3 : INK 3,26 : PRINT "You must giv
e the   correct answer to   ten questions."
110 PRINT : PEN 4 : INK 4,1 : PRINT "Hit any key t
o start"
120 a$ = INKEY$ : IF a$ = "" THEN 120
130 CLS : BORDER 9 : PAPER 0 : INK 0,22 : PEN 1 :
INK 1,6 : LOCATE 1,4 : PRINT "How hard do you want
your division?"
140 PRINT: PRINT : PRINT " 1) easy" : PRINT : PRIN
T " 2) harder" : PRINT : PRINT " 3) very hard"
150 PRINT : PRINT "Type 1, 2 or 3"
160 PRINT : INPUT d
170 IF d < 1 OR d > 3 THEN PRINT "I said 1, 2 or 3
" : FOR t = 1 TO 2000 : NEXT t : GOTO 130
180 total = 0
190 datum = INT(TIME/300)
200 CLS : BORDER 6 : PAPER 0 : INK 0,0
205 WINDOW #1,10,20,10,1 : ticker = INT((TIME/300)
-datum) : LOCATE 1,1 : PEN #1,7 : INK 1,7,24 : PRI
NT #1,ticker;"secs"
210 IF d = 1 THEN a = INT(RND*10)+1 : b = INT(RND*
10)+1 : p = a*b
215 IF d = 2 THEN a = INT(RND*11)+10 : b = INT(RND
*10)+1 : p = a*b
220 IF d = 3 THEN a = INT(RND*11)+10 : b = INT(RND
*11)+10 : p = a*b
230 GOSUB 500 : GOSUB 510 : y = 0 : z = 6 : GOSUB
530
240 LOCATE 5,9 : PEN 3 : PRINT p;CHR$(37);;b
250 LOCATE 7,11 : INPUT ans
260 IF ans <> p/b THEN 400
270 PEN 6 : INK 6,5 : PRINT : PRINT "great, great,
 great"
275 PRINT : PRINT "      well done"
277 LOCATE 8,17 : PRINT name$
280 FOR g = 1 TO 10 : FOR t = 1 TO 200 : NEXT t :
SOUND 1,40,20,7 : NEXT g
290 total = total + 1 : IF total = 10 THEN GOTO 30
0
292 y = 7 : z = 16 : GOSUB 520 : FOR jk = 0 TO 3 :
 FOR lm = 0 TO 2 : LOCATE 7+jk,21+lm : PRINT CHR$(
32) : NEXT lm : NEXT jk : GOSUB 530
295 GOTO 200
300 CLS : CLS #1 : LOCATE 2,6 : PRINT "You took ";
ticker;"secs" : PRINT : PRINT "to get 10 correct."
310 PRINT : PRINT "Do you want 10 more?"
315 INPUT n$ : IF n$ = "y" OR n$ = "yes" OR n$ = "
Y" OR n$ = "YES" THEN 130
320 PRINT : PRINT "Bye for now" : END
400 PRINT : PRINT : FOR c = 7 TO 3 STEP -1
410 SOUND 1,1911,40,c
420 PEN 5 : INK 5,18 : PRINT "No  "; : NEXT c
430 PRINT : PRINT "answer is ";p/b : FOR t = 1 TO
3000 : NEXT t : GOTO 200
500 PEN 3 : FOR w = 0 TO 2 : LOCATE 12,18+w : PRIN
T CHR$(133) : LOCATE 11,21+w : PRINT CHR$(209) : L
OCATE 12,21+w : PRINT CHR$(211) : NEXT w : FOR ww
= 0 TO 19 : LOCATE 1+ww,24 : PRINT CHR$(208) : NEX
T ww : RETURN
510 PEN 1 : INK 1,6 : FOR w = 0 TO 2 : LOCATE 11,1
8+w : PRINT CHR$(138) : NEXT w : RETURN
520 PEN 9 : INK 9,18 : FOR w = 0 TO 2 : LOCATE 11,
18+w : PRINT CHR$(138) : NEXT w : RETURN
530 PEN 7 : INK 7,24 : FOR x = y TO z : LOCATE 1+x
,21 : PRINT CHR$(214) : FOR w = 0 TO 1 : LOCATE 2+
w+x,21 : PRINT CHR$(207) : NEXT w
535  FOR w = 0 TO 3 : LOCATE 1+w+x,22 : PRINT CHR$
(143) : NEXT w : LOCATE 1+x,23 : PRINT CHR$(202) :
 LOCATE 4+x,23 : PRINT CHR$(202) : IF x = 6 OR x =
 16 THEN 539
536 GOSUB 550 : GOSUB 540
```

```
537 IF x = 11 THEN PEN 3 : INK 3,26 : FOR wv = 0 T
O 2 : LOCATE 11,21+wv : PRINT CHR$(209) : LOCATE 1
2,21+wv : PRINT CHR$(211) : NEXT wv : PEN 7 : INK
7,24
538 NEXT x
539 RETURN
540 FOR w = 0 TO 3 : FOR ww = 0 TO 2 : LOCATE 1+w+
x,21+ww : PRINT CHR$(32) : NEXT ww : NEXT w : RETU
RN
550 FOR ss = 1 TO 2 : SOUND 1,119,10,5 : FOR t = 1
 TO 100 : NEXT t : NEXT ss : RETURN
```

PHRASE

PARENTS- this is a program to aid language development, and improve and extend vocabulary, by selecting a single word to replace a given phrase within a sentence.

CHILDREN- at the top of your screen you will find ten words within a box. Underneath the box is a sentence with part of it in capital letters. Your screen will look like this:-



seldom
recently
century
population
released
unaided
visible
painlessly
emigrate
library

***

After six months in gaol the prisoner
was GIVEN HIS FREEDOM.

? ■

Your task is to choose a word from the box to replace all those words in capitals. When you have chosen your word, type it into the computer and press the ENTER key. If you are right, you will be awarded a star. Can you collect ten stars? Have a go!

TYPING TIP

In the DATA lines (500 to 890) you will notice some extra large gaps between certain words. Make sure that you leave all these gaps when typing the lines in. These spaces are necessary otherwise, when the sentence appears on the screen, words will become split.

PROGRAMMING HINTS - RESTORE

Using the word 'RESTORE' will send the reading data pointer back to the beginning of the DATA, so enabling the Data to be used again in a READ statement. RESTORE 500 would send the reading data pointer to line 500. This enables any set of DATA to be read by giving the line number at which the Data begins after the RESTORE command.

```
10 REM phrases
12 CLS
14 RESTORE
15 DIM sent$(39) : DIM word$(39)
20 FOR a = 0 TO 39
30 READ sent$(a) : NEXT a
40 FOR b = 0 TO 39
50 READ word$(b) : NEXT b
90 good = 0
100 IF good = 10 THEN LOCATE 29,12 : PRINT "*" : L
OCATE 3,14 : PRINT "W E L L  D O N E  T E N  S T A
 R S" : END
105 CLS : BORDER 8 :  PAPER 4 : PEN 2
110 pro = INT(RND*40)
120 GOSUB 300 : GOSUB 380
122 IF good = 0 GOTO 130
125 GOSUB 475
130 PEN 3 : INK 3,6 : LOCATE 1,16 : PRINT sent$(pr
o)
140 LOCATE 9,20 : INPUT ans$
150 IF ans$ = word$(pro) THEN GOSUB 340 : GOTO 100
160 LOCATE 4,22 : FOR q = 0 TO 10 : PRINT "NO ";  :
 NEXT q
165 FOR t = 1 TO 2000 : NEXT t : GOTO 100
300 INK 2,18 : FOR c = 0 TO 33 : LOCATE 4+c,3 : PR
INT CHR$(140) : LOCATE 4+c,9 : PRINT CHR$(131) : N
EXT c
310 FOR d = 0 TO 4 : LOCATE 4,4+d :PRINT CHR$(133)
 : LOCATE 37,4+d : PRINT CHR$(138) : NEXT d
320 RETURN
340 SOUND 1,63,20,6 : PEN 3 : INK 3,6 : FOR e = 0
TO 36 : LOCATE 1+e,2 : PRINT "good" : LOCATE 1+e,2
 : PRINT "     " : NEXT e
350 SOUND 1,63,20,6 : FOR f = 0 TO 36 : LOCATE 37-
f,10 : PRINT "good" : LOCATE 37-f,10 : PRINT "
" : NEXT f
360 good = good + 1 : RETURN
380 g = INT(RND*40) : h = INT(RND*40) : j = INT(RN
D*40) : k = INT(RND*40) : l = INT(RND*40)
385 m = INT(RND*40) : n = INT(RND*40) : o = INT(RN
D*40) : p = INT(RND*40)
390 IF g = h OR g = j OR g = k OR g = l OR g = m O
R g = n OR g = o OR g = p THEN 380
392 IF h = j OR h = k OR h = l OR h = m OR h = n O
R h = o OR h = p THEN 380
394 IF j = k OR j = l OR j = m OR j = n OR j = o O
R j = p THEN 380
396 IF k = l OR k = m OR k = n OR k = o OR k = p T
HEN 380
398 IF l = m OR l = n OR l= o OR l = p THEN 380
```

```
400 IF m = n OR m = o OR m = p THEN 380
402 IF n = o OR n = p THEN 380
404 IF o = p THEN 380
410 ps = INT(RND*5)
412 ON PS GOTO 415,425,435,445,455
415 LOCATE 6,4 : PRINT word$(pro);"  ";word$(h) :
LOCATE 7,5 : PRINT word$(j);"  ";word$(k)
416 LOCATE 10,6 : PRINT word$(g);"  ";word$(m) : L
OCATE 6,7 : PRINT word$(n);"  ";word$(o)
417 LOCATE 8,8 : PRINT word$(p);"  ";word$(l) : RE
TURN
425 LOCATE 6,4 : PRINT word$(n);"  ";word$(h) : LO
CATE 7,5 : PRINT word$(j);"  ";word$(k)
426 LOCATE 10,6 : PRINT word$(g);"  ";word$(m) : L
OCATE 6,7 : PRINT word$(pro);"  ";word$(o)
427 LOCATE 8,8 : PRINT word$(p);"  ";word$(l) : RE
TURN
435 LOCATE 6,4 : PRINT word$(n);"  ";word$(h) : LO
CATE 7,5 : PRINT word$(j);"  ";word$(k)
436 LOCATE 10,6 : PRINT word$(pro);"  ";word$(m) :
 LOCATE 6,7 : PRINT word$(g);"  ";word$(o)
437 LOCATE 8,8 : PRINT word$(p);"  ";word$(l) : RE
TURN
445 LOCATE 6,4 : PRINT word$(n);"  ";word$(h) : LO
CATE 7,5 : PRINT word$(pro);"  ";word$(k)
446 LOCATE 10,6 : PRINT word$(j);"  ";word$(m) : L
OCATE 6,7 : PRINT word$(g);"  ";word$(o)
447 LOCATE 8,8 : PRINT word$(pro);"  ";word$(l) :
RETURN
455 LOCATE 6,4 : PRINT word$(n);"  ";word$(h) : LO
CATE 7,5 : PRINT word$(p);"  ";word$(k)
456 LOCATE 10,6 : PRINT word$(j);"  ";word$(m) : L
OCATE 6,7 : PRINT word$(g);"  ";word$(pro)
457 LOCATE 8,8 : PRINT word$(o);"  ";word$(l) : RE
TURN
475 LOCATE 11,12 : FOR r = 1 TO good
480 PRINT "* "; : NEXT r : RETURN
500 DATA Michael did all his English work WITHOUT
A SINGLE MISTAKE.
510 DATA The batsman scored ONE HUNDRED RUNS.
520 DATA In Britain many animals PASS THE WINTER I
N SLEEP.
530 DATA The policeman stopped the traffic for   t
he PEOPLE WHO WERE ON FOOT to cross the road.
540 DATA NOW AND AGAIN we go to visit our        r
elatives.
550 DATA During the GREAT SHORTAGE OF RAIN the   r
ivers and streams dried up.
560 DATA Several of the PEOPLE WHO APPLIED FOR   T
HE POST were too old.
```

```
570 DATA Mrs. Jones left the house IN A GREAT    H
URRY.
580 DATA The two brothers were INCLINED TO       Q
UARREL.
590 DATA The ship could just be seen on the LINE W
HERE THE SEA AND SKY APPEAR TO MEET.
600 DATA The Motor Show is held ONCE EVERY YEAR.
610 DATA The storms and monsoons left thousands  o
f people WITHOUT A HOME.
620 DATA Every year many people LEAVE ENGLAND TO S
ETTLE IN OTHER COUNTRIES.
630 DATA There was a large GATHERING OF          W
ORSHIPPERS for the Easter service.
640 DATA At the end of the concert THE PEOPLE WHO
WERE LISTENING stood and applauded.
650 DATA The school has a large ROOM WHERE ALL   T
HE BOOKS ARE KEPT.
660 DATA The train arrived in the station DEAD ON
TIME.
670 DATA The dentist extracted the tooth WITHOUT A
NY PAIN.
680 DATA The CHILDREN WHO HAD LOST THEIR PARENTS w
ere cared for by friends.
690 DATA The children DID AS THEY WERE TOLD      I
MMEDIATELY.
700 DATA After six months in gaol the prisoner   w
as GIVEN HIS FREEDOM.
710 DATA John is HARDLY EVER absent from school.
720 DATA The ship was no longer TO BE SEEN.
730 DATA The record is THE ONLY ONE OF IT'S KIND I
N EXISTANCE.
740 DATA The work was done OF HIS OWN FREE WILL.
750 DATA The old lady walked to shop WITHOUT ANY H
ELP AT ALL.
760 DATA John is TOO FOND OF TALKING in the class
770 DATA I had a most thrilling experience NOT   L
ONG AGO.
780 DATA Scrooge was a MAN WHO HOARDED HIS MONEY.
790 DATA Cows and sheep are ANIMALS WITH FOUR    F
EET.
800 DATA The doctor's writing was NOT CAPABLE OF B
EING READ.
810 DATA The big cities of the world have a very l
arge NUMBER OF PEOPLE LIVING IN THEM.
820 DATA Never keep company  with a PERSON WHO   T
AKES A GLOOMY VIEW OF EVERYTHING.
830 DATA Misfortunes never worry the MAN WHO     L
OOKS ON THE BRIGHT SIDE OF LIFE.
840 DATA John was LIKED BY EVERY ONE.
850 DATA Peter LOOKS VERY MUCH LIKE his father.
```

```
860 DATA The heat of the sun was MORE THAN ONE   C
OULD BEAR.
870 DATA The accident had left the man INCAPABLE O
F SPEAKING.
880 DATA The survivor told his story IN FEW WORDS
890 DATA The man was KILLED BY THE ELECTRIC SHOCK
900 DATA correctly,century,hibernate,pedestrians,o
ccasionally,drought,applicants,hurriedly,quarrelso
me
910 DATA horizon,annually,homeless,emigrate,congre
gation,audience,library,punctually,painlessly
920 DATA orphan,obeyed,released,seldom,visible,uni
que,voluntarily,unaided,talkative,recently,miser,q
uadrupeds
930 DATA illegible,population,pessimist,optimist,p
opular,resembles,unbearable,speechless,briefly,ele
ctrocuted
```

SAM CAT

PARENTS- this is a program designed to help the four to eight year old to learn simple spelling. The program includes thirty words which are randomly selected in the program and then flashed on and off the screen four times. The words are printed in lower case ("small" letters). The child then has to type in the correct word and success is rewarded as Sam is built and receives his milk, giving out a satisfactory 'purr'. If the answer is wrong then the correct one is given. When the answer has been typed in, the ENTER key must be pressed. Success at the end is also rewarded with the tune:

"Pussy cat, Pussy cat"

"Where have you been?"

Remembering the words sometimes causes a little difficulty and a reference card with the vocabulary being used can be given to the children to reinforce Sam's efforts.

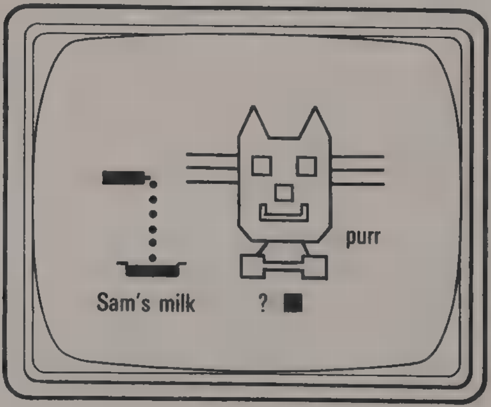
CHILDREN- listen to:

"Pussy cat, Pussy cat"

"Where have you been?"

and practise your spellings. Build Sam Cat by spelling the words after they have flashed on the screen. You must press ENTER after you have spelt the word.

Your screen will look like this:-



TYPING TIP

This program is easily adapted for other words, all that is necessary is for thirty different words to be substituted in the inverted commas in lines 500 to 520. Do not put more than thirty words as the program would not work and more than this is too many for children to practise at once. Why not insert in the program the weekly spellings from school? This is certainly an enjoyable way to learn.

PROGRAMMING HINT - MUSIC from DATA

In the program listing, lines 700 to 715 contain the tune:-

"Pussy cat, Pussy cat"

"Where have you been?"

Type this out separately from the program and run it. You will have the tune. Let's explain what is happening:-

Line 700 is a REMinder to show the program that follows.
Line 702 RESTORES the DATA reading pointer to the beginning of the DATA, which is line 710.
Line 705 instructs the computer to READ two DATA statements.
Line 706 is an IF statement so that when -1 is READ the program RETURNS to the next statement after the GOSUB. This music program is on a subroutine, so will RETURN to the section of the program from whence it came.
Line 707 substitutes each of the two READ statements into the SOUND command and then sends the routine back to line 705 and the next two READings from the DATA. The readings are in pairs and represent the musical note and the length of the note.
Lines 710 and 715 contain the DATA to be READ.

```
1 REM sam
10 z$ = CHR$(143)+CHR$(143) : x$ = CHR$(32)+CHR$(3
2)+CHR$(32)+CHR$(32)
20 DIM w$(29)
40 PEN 0 : INK 0,0 : PEN 1 : INK 1,6 : PEN 2 : INK
 2,18 : PEN 3 : INK 3,24
50 WINDOW #1,1,40,1,20
55 WINDOW #2,1,40,21,25
58 WINDOW #3,1,40,1,25
59 WINDOW #4,1,7,10,16
60 BORDER 0 : PAPER 0 : CLS #3
70 GOSUB 300 : GOSUB 310 : GOSUB 320 : GOSUB 330 :
 GOSUB 340 : GOSUB 350 : GOSUB 360
75 GOSUB 370 : GOSUB 380 : GOSUB 390
77 LOCATE #1,13,2 : PRINT #1,"S A M   C A T"
80 LOCATE #2,6,2 : PRINT #2,"H E L P   B U I L D
```

```
 S A M" : PRINT #2 : PRINT #2,"A N D   L E A R N
 Y O U R   W O R D S"
85 GOSUB 700
90 GOSUB 500 : g = 0
92 CLS #3
93 GOSUB 420
95 a = INT(RND*30)
105 FOR b = 1 TO 4 : CLS #2 : FOR t = 1 TO 400 : N
EXT t
110 PEN #2,2 : LOCATE #2,18,3 : PRINT #2,w$(a)
112 SOUND 1,127,25,6
115 FOR t = 1 TO 700 : NEXT t : NEXT b
120 CLS #2 : LOCATE #2,18,3 : INPUT #2,ans$ : FOR
t = 1 TO 500 : NEXT t
130 IF ans$ = w$(a) THEN q = q + 1 : GOTO 200
150 LOCATE #2,18,5 : PRINT #2,w$(a) : FOR t = 1 TO
 2000 : NEXT t : GOTO 95
200 IF q = 1 THEN GOSUB 300
202 IF q = 2 THEN GOSUB 310
204 IF q = 3 THEN GOSUB 320
206 IF q = 4 THEN GOSUB 330
208 IF q = 5 THEN GOSUB 340
210 IF q = 6 THEN GOSUB 350
212 IF q = 7 THEN GOSUB 360
214 IF q = 8 THEN GOSUB 370
216 IF q = 9 THEN GOSUB 380
218 IF q = 10 THEN GOSUB 390 : GOSUB 450 : GOTO 25
0
230 GOSUB 450 : CLS #4 : GOTO 95
250 CLS #2 : LOCATE #2,1,2 : PRINT #2,"Sam says th
ank you. He has all the milk that he needs." : FOR
 x = 1 TO 20 : BORDER INT(RND*27) : SOUND 1,22,10,
6 : FOR t = 1 TO 250 : NEXT t : NEXT x : GOSUB 700
 : END
300 REM face
305 PEN #1,3 : FOR n = 0 TO 9 : FOR m = 0 TO 8 : L
OCATE #1,15+n,6+m : PRINT #1,CHR$(143) : NEXT m :
NEXT n
307 FOR n = 0 TO 5 : FOR m = 0 TO 1 : LOCATE #1,17
+n,15+m : PRINT #1,CHR$(143) : NEXT m : NEXT n
308 LOCATE #1,15,15 : PRINT #1,CHR$(213)CHR$(143)
: LOCATE #1,16,16 : PRINT #1,CHR$(213) : LOCATE #1
,23,15 : PRINT #1,CHR$(143)CHR$(212) : LOCATE #1,2
3,16 : PRINT #1,CHR$(212)
309 RETURN
310 REM left ear
315 PEN #1,3 : LOCATE #1,16,4 : PRINT #1,CHR$(214)
CHR$(215) : LOCATE #1,15,5 : PRINT #1,CHR$(214);z$
;CHR$(215) : RETURN
320 REM right ear
```

```
325 PEN #1,3 : LOCATE #1,22,4 : PRINT #1,CHR$(214)
CHR$(215) : LOCATE #1,21,5 : PRINT #1,CHR$(214);z$
;CHR$(215) : RETURN
330 REM left eye
335 PEN #1,1 : FOR k = 0 TO 2 : FOR j = 0 TO 1 : L
OCATE #1,16+k,8+j : PRINT #1,CHR$(143) : NEXT j :
NEXT k : RETURN
340 REM right eye
345 PEN #1,1 : FOR k = 0 TO 2 : FOR j = 0 TO 1 : L
OCATE #1,21+k,8+j : PRINT #1,CHR$(143) : NEXT j :
NEXT k : RETURN
350 REM nose
355 PEN #1,1 : LOCATE #1,19,11 : PRINT #1,z$ : LOC
ATE #1,19,12 : PRINT #1,z$
358 PLOT 303,208,0 : DRAW 303,192,0 : RETURN
360 REM mouth
365 PEN #1,1 : LOCATE #1,17,13 : PRINT #1,CHR$(207
) : LOCATE #1,17,14 : PRINT #1,CHR$(207)CHR$(207)C
HR$(207)CHR$(207)CHR$(207)CHR$(207) : LOCATE #1,22
,13 : PRINT #1,CHR$(207) : RETURN
370 REM whisker
375 FOR h = 256 TO 224 STEP -16 : PLOT 382,h,2 : D
RAW 459,h,2 : NEXT h : RETURN
380 REM whisker
385 FOR h = 256 TO 224 STEP -16 : PLOT 222,h,2 : D
RAW 145,h,2 : NEXT h : RETURN
390 REM tie
395 PEN #1,2 : LOCATE #1,17,17 : PRINT #1,CHR$(214
);z$;z$;CHR$(215)
400 PEN #1,1 : FOR g = 0 TO 2 : FOR f = 0 TO 1 : L
OCATE #1,15+g,18+f : PRINT #1,CHR$(143) : LOCATE #
1,22+g,18+f : PRINT #1,CHR$(143) : NEXT f : NEXT g
405 FOR f = 0 TO 3 : LOCATE #1,18+f,18 : PRINT #1,
CHR$(140) : LOCATE #1,18+f,19 : PRINT #1,CHR$(131)
 : NEXT f : RETURN
420 PEN #1,1 : LOCATE #1,3,17 : PRINT #1,CHR$(139)
 : LOCATE #1,9,17 : PRINT #1,CHR$(135)
425 LOCATE #1,3,18 : PRINT #1,CHR$(138)CHR$(32)CHR
$(32)CHR$(32)CHR$(32)CHR$(32)CHR$(133) : LOCATE #1
,3,19 : PRINT #1,CHR$(130)CHR$(131)CHR$(131)CHR$(1
31)CHR$(131)CHR$(131)CHR$(129)
430 PEN #1,3 : LOCATE #1,1,20 : PRINT #1,"Sam's mi
lk" : RETURN
450 REM bottle
455 LOCATE #4,1,1 : PEN #4,3 : PRINT #4,z$;z$;CHR$
(140) : LOCATE #4,1,2 : PRINT #4,z$;z$;CHR$(131) :
 FOR v = 0 TO 5 : LOCATE #4,6,2+v : PRINT #4,CHR$(
231) : NEXT v
460 FOR vv = 6 TO 0 STEP -1 : SOUND 1,758,20,vv :
FOR t = 1 TO 150 : NEXT t : NEXT vv
```

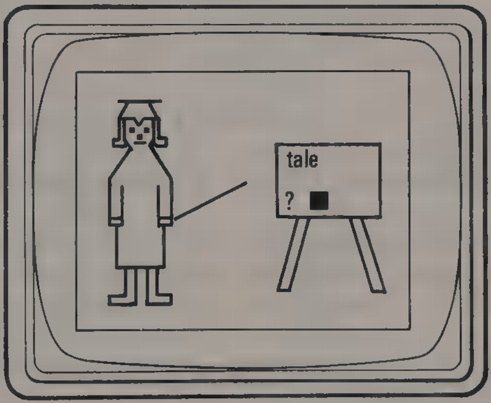
```
462 LOCATE #1,4,18 : PEN #1,3 : PRINT #1,z$;z$;CHR
$(143) : LOCATE #1,32,14 : PRINT #1,"purr" : FOR u
463 LOCATE #1,32,14 : PRINT #1,x$
465 FOR t = 1 TO 900 : NEXT t : RETURN
500 w$(0) = "and" : w$(1) = "he" : w$(2) = "this"
: w$(3) = "the" : w$(4) = "in" : w$(5) = "is" : w$
(6) = "playing" : w$(7) = "at" : w$(8) = "are" : w
$(9) = "am" : w$(10) = "a"
510 w$(11) = "home" : w$(12) = "girl" : w$(13) = "
garden" : w$(14) = "mummy" : w$(15) = "daddy" : w$
(16) = "baby" : w$(17) = "boy" : w$(18) = "house"
: w$(19) = "with" : w$(20) = "out"
520 w$(21) = "walk" : w$(22) = "man" : w$(23) = "w
hat" : w$(24) = "nice" : w$(25) = "they" : w$(26)
= "shop" : w$(27) = "went" : w$(28) = "was" : w$(2
9) = "some"
525 RETURN
700 REM music
702 RESTORE
705 READ e : READ d
706 IF e = -1 THEN RETURN
707 SOUND 1,e,d,6 : GOTO 705
710 DATA 426,25,0,5,319,25,0,10,319,46,0,20,319,25
,0,5,338,25,0,10,319,45,0,20,284,35,0,10,253,35,0,
10,319,35,0,10,284,70,0,10,379,35,0,10,338,35,0,10
,319,35,0,10,284,35,0,10,253,35,0,5,253,50,0,10,23
9,35,0,10,213,85
715 DATA 0,10,253,40,0,10,319,100,0,10,-1,-1
```

MISS HOMONYM

PARENTS - this is a program designed to give practice with homonyms, help develop language and extend vocabulary.

CHILDREN- in this program you will meet Miss Homonym and, at the same time, test your knowledge and understanding of homonyms (words which sound the same but are spelt differently). The program includes fifty pairs of homonyms but Miss Homonym will only test you on ten of these at any one time. A word will appear on a blackboard and you must type the corresponding homonym. Remember to press ENTER after each word has been typed onto the blackboard. A correct answer pleases Miss Homonym who will flash her eyes at you. An incorrect answer will make her shake her stick whilst she tells you the right word. Your score will be given on the blackboard.

Your screen will look like this:-



Good luck..... and try to please Miss Homonym!!

TYPING TIP

The program can easily be adapted for fifty more pairs of homonyms. All that has to be done, is for the DATA lines (500 to 530) to be erased and for new words to be substituted.

PROGRAMMING HINT - `DIM`

This command is used in many programs and indicates an array or matrix of variables. The DIM command will allocate space for all the variables in an array. For instance, line 10 of the program reads:-

```
10 DIM h$(49) : DIM g$(49)
```

The two `DIM` commands each reserve space in the memory for 50 variables. The first 50, will have the names
h$(0)...h$(1)...h$(2)...h$(3)...........h$(49); and the second 50, will have the names g$(0)...g$(1)...g$(2)...g$(3)...........g$(49) .
An array starts at 0 so DIM h$(49) will have 50 items numbered 0 to 49.
It is good programming practice to declare all the arrays at the beginning of a program.

```
1 REM miss homonym
10 DIM h$(49) : DIM g$(49)
12 k$ = CHR$(210)+CHR$(210)+CHR$(210)+CHR$(210)+CH
R$(210)+CHR$(210) : j$ = CHR$(32)+CHR$(32) : n$ =
CHR$(208)+CHR$(208)
14 e$ = CHR$(32)+CHR$(32)+CHR$(32)+CHR$(32)+CHR$(3
2)+CHR$(32) : f$ = CHR$(32)+CHR$(32)+CHR$(32)+CHR$
(32) : b$ = CHR$(211)+CHR$(209)
15 WINDOW #1,1,40,1,25 : WINDOW #2,22,40,3,14 : WI
NDOW #3,1,21,1,25
20 PEN 0 : INK 0,0 : PEN 1 : INK 1,8 : PEN 2 : INK
 2,26 : PEN 3 : INK 3,18
30 FOR a = 0 TO 49 : READ h$(a) : READ g$(a) : NEX
T a
35 CLS #1 : GOSUB 300 : LOCATE #2,5,2 : PRINT #2,"
HOMONYMS--words    which sound the    same but are
 spelt differently."
37 GOSUB 480
40 CLS #1 : f = 0 : m = 0 : GOSUB 300 : GOSUB 450
45 CLS #2
47 IF m = 10 THEN GOTO 490
60 d = INT(RND*50) : m = m + 1
70 c = INT(RND*2)+1
75 ON c GOTO 100,200
100 PEN #2,3 : LOCATE #2,2,4 : PRINT #2,h$(d)
110 PEN #2,1 :LOCATE #2,2,6 : INPUT #2,ans$
120 IF ans$ = g$(d) THEN GOTO 400
130 PRINT #2,"No, answer is" : PRINT #2,g$(d) : GO
SUB 350
140 GOTO 45
200 PEN #2,3 : LOCATE #2,2,4 : PRINT #2,g$(d)
210 PEN #2,1 :LOCATE #2,2,6 : INPUT #2,ans$
```

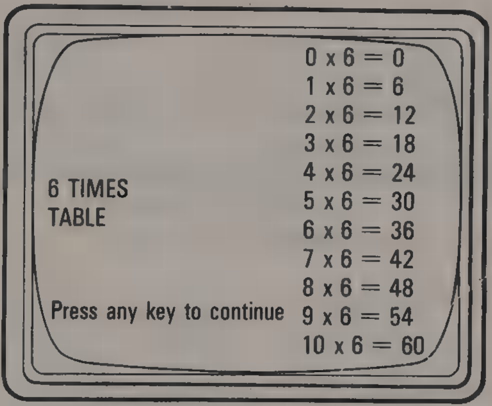
```
220 IF ans$ = h$(d) THEN GOTO 400
230 PRINT #2,"No, answer is" : PRINT #2,h$(d) : GO
SUB 350
240 GOTO 45
300 PAPER #2,2 : CLS #2 : PLOT 375,0,2 : DRAW 395,
176,2 : DRAW 410,176 : DRAW 390,0 : DRAW 375,0
310 PLOT 610,0,2 : DRAW 590,176,2 : DRAW 575,176 :
 DRAW 595,0 : DRAW 610,0 : RETURN
350 PEN #3,2 : FOR r = 1 TO 3 : FOR q = 0 TO 5 : L
OCATE #3,13+q,16-q : PRINT #3,CHR$(204) : NEXT q :
 GOSUB 370 : FOR q = 0 TO 5 : LOCATE #3,13+q,16-q
: PRINT #3,CHR$(32) : NEXT q : GOSUB 370
355 FOR q = 0 TO 7 : LOCATE #3,13+q,16 : PRINT #3,
CHR$(210) : NEXT q : GOSUB 370
360 FOR q = 0 TO 7 : LOCATE #3,13+q,16 : PRINT #3,
CHR$(32) : NEXT q : GOSUB 370 : NEXT r : RETURN
370 SOUND 1,3822,20,7,0,0,15 : FOR t = 1 TO 200 :
NEXT t : RETURN
400 f = f + 1 : LOCATE #2,9,8 : PRINT #2,f : LOCAT
E #2,10,9 : PRINT #2,CHR$(154)CHR$(154) : LOCATE #
2,9,10 : PRINT #2,m
405 FOR p = 1 TO 5
407 LOCATE #3,7,5 : PRINT #3,f$ : GOSUB 440
409 PEN #3,1 : LOCATE #3,7,5 : PRINT #3,CHR$(136);
j$;CHR$(132) : GOSUB 440
410 NEXT p
415 GOTO 45
440 SOUND 1,478,20,7 : SOUND 2,3034,20,5 : FOR t =
 1 TO 200 : NEXT t : RETURN
450 PEN #3,1 : PRINT #3,TAB(6);k$ : PRINT #3,TAB(7
);CHR$(204);j$;CHR$(205) : PRINT #3,TAB(6);CHR$(20
4);j$;j$;CHR$(205)
452 PRINT #3,TAB(6);CHR$(143)CHR$(208)CHR$(205)CHR
$(204)CHR$(208)CHR$(143) : PRINT #3,TAB(6);CHR$(14
3)CHR$(136);j$;CHR$(132)CHR$(143)
454 PRINT #3,TAB(6)CHR$(143)CHR$(32)CHR$(130)CHR$(
129)CHR$(32)CHR$(143) : PRINT #3,TAB(5);CHR$(143)C
HR$(143)CHR$(210);n$;CHR$(210)CHR$(143)CHR$(143)
456 PRINT #3,TAB(7);CHR$(204);j$;CHR$(205) : PRINT
 #3,TAB(6);CHR$(204);j$;j$;CHR$(205) : PRINT #3,TA
B(5);CHR$(204);e$;CHR$(205)
458 FOR k = 0 TO 4 : PRINT #3,TAB(5);b$;f$;b$ : NE
XT k
459 PRINT #3,TAB(5);CHR$(207);CHR$(207);f$;CHR$(20
7)CHR$(207)
460 FOR k = 0 TO 3 : PRINT #3,TAB(5);CHR$(209);e$;
CHR$(211) : NEXT k
462 PRINT #3,TAB(5);CHR$(209);k$;CHR$(211)
464 FOR k = 0 TO 2 : PRINT #3,TAB(7);CHR$(206);j$;
CHR$(206) : NEXT k : PRINT #3,TAB(6);CHR$(206)CHR$
```

```
(206);j$;CHR$(206)CHR$(206)
468 RETURN
480 FOR t = 1 TO 2500 : NEXT t : RETURN
490 CLS #2 : PRINT #2,"   You managed" : LOCATE #2
,8,5 : PRINT #2,f : LOCATE #2,8,6 : PRINT #2,CHR$(
154)CHR$(154) : LOCATE #2,8,7 : PRINT #2,"10"
495 PRINT #2,"Type run for ten   more words"
497 INPUT #2,a$ : IF a$ = "run" THEN RUN ELSE END
500 DATA muscle,mussel,pain,pane,pause,paws,peace,
piece,peel,peal,place,plaice,plain,plane,plum,plum
b,profit,prophet,prey,pray
510 DATA roll,role,rye,wry,sail,sale,tail,tale,the
ir,there,sew,sow,site,sight,tied,tide,vale,veil,wo
od,would,thyme,time
520 DATA waist,waste,beach,beech,aisle,isle,holy,w
holly,air,heir,allowed,aloud,bail,bale,ball,bawl,b
are,bear,berry,bury,berth,birth,boar,bore,bough,bo
w,boy,buoy,sea,see,cellar,seller,cereal,serial
530 DATA sun,son,dear,deer,die,dye,earn,urn,fir,fu
r,flew,flue,foul,fowl,mare,mayor,meat,meet,our,hou
r,idle,idol,made,maid
```

LAUNCH-A-ROCKET

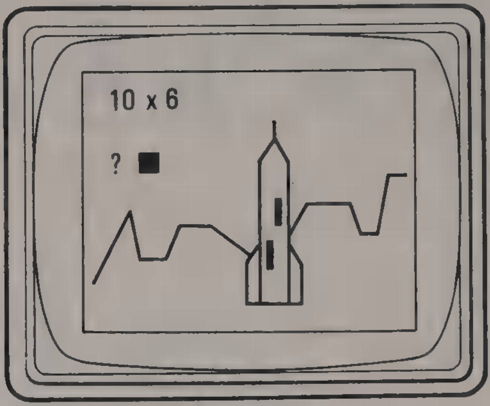
PARENTS- this is a fun program to test, practice and improve times table skills.

CHILDREN- build your space ship and travel to Mars. The program begins by giving you a choice of times tables to practice. You can test your memory with any table between 1 and 10. To help you, the program will show you the whole table to be tested and your screen will look like this:-



```
                                 0 x 6 = 0
                                 1 x 6 = 6
                                 2 x 6 = 12
                                 3 x 6 = 18
                                 4 x 6 = 24
6 TIMES                          5 x 6 = 30
TABLE                            6 x 6 = 36
                                 7 x 6 = 42
                                 8 x 6 = 48
Press any key to continue        9 x 6 = 54
                                10 x 6 = 60
```

Each time you give a correct answer, your rocket will gradually take shape until it is complete and you reach "Blast Off" time....then away you go.... the intrepid explorer to Mars.



After each answer, you MUST remember to press the ENTER key.

SAFE JOURNEYING!!!

TYPING TIPS

Make sure in line 15 that d$ = "   " has five spaces and that e$ = "   " has twenty-three spaces.

PROGRAMMING HINTS - STRING VARIABLE

On several occasions in this program it was necessary to print spaces so rather than write each time:

```
    10 PRINT "     "

 or 10 PRINT "                       "
```

it is more convenient, less tedious and better programming to put this in a string variable, hence line 15 has `d$ = "     "` and `e$ = "                       "`.

When the program requires 6 or 23 spaces, the command will read

```
  PRINT d$

or PRINT e$

or PRINT "Hello";d$;"Dad"
```

Try this short program:-

```
10 d$ = "John Smith" : e$ = "   "

20 PRINT "Hello";e$;d$
```

```
10 REM launch-a-rocket
15 d$ = "      " : e$ = "                        "
20 BORDER 7 : PAPER 0 : INK 0,10 : PEN 1 : INK 1,3
25 CLS : LOCATE 7,5 : PRINT "L A U N C H  A  R O C
 K E T"
30 LOCATE 12,9 : PRINT "YOU NEED 10 TABLES"
40 LOCATE 13,11 : PRINT "CORRECT TO BUILD" : LOCAT
E 15,13 : PRINT "AND FIRE YOUR" : LOCATE 19,15 : P
RINT "ROCKET"
50 LOCATE 3,19 : PEN 2 : INK 2,1 : PRINT "Which ta
ble do you wish to practise?"
60 LOCATE 12,20 : PRINT "(Tables 1 to 10)"
70 LOCATE 16,22 : PEN 1 : INK 1,3 : INPUT x
75 IF x > 0 AND x < 11 THEN 100
80 LOCATE 9,23 : PRINT "I said between 1 and 10" :
 FOR t = 1 TO 2500 : NEXT t
85 LOCATE 16,22 : PRINT d$ : LOCATE 9,23 : PRINT e
$ : GOTO 70
100 BORDER 0 : INK 0,0 : PEN 1 : INK 1,18
115 CLS : PEN 2 : INK 2,26 : LOCATE 1,1
120 FOR a = 0 TO 10 : PRINT TAB(15)a;"  X ";x;"= "
;a*x : PRINT : GOSUB 300 : NEXT a
125 PEN 1 : INK 1,18 : LOCATE 2,5 : PRINT x;"TIMES
" : LOCATE 3,7 : PRINT "TABLE"
130 LOCATE 11,25 : PRINT "Press any key to continu
e"
135 a$ = INKEY$ : IF a$ = "" THEN 135
150 CLS : BORDER 0 : PAPER 0 : INK 0,11
155 correct = 0
160 c = INT(RND*11) : GOSUB 320
170 LOCATE 3,2 : PEN 1 : INK 1,6 : PRINT c;" X ";x

180 LOCATE 3,3 : INPUT ans
185 IF ans <> c*x THEN 250
190 LOCATE 3,5 : PEN 2 : INK 2,26 : PRINT "Good"
195 FOR t = 1 TO 1000 : NEXT t : correct = correct
 + 1
200 ON correct GOTO 400,405,415,430,445,450,475,49
0,505,520
250 LOCATE 3,4 : PEN 2 : INK 2,26 : PRINT "Sorry"
```

```
252 LOCATE 3,5 : PRINT "answer is ";c*x
254 FOR t = 1 TO 3000 : NEXT t
260 GOTO 160
300 SOUND 1,1607,50,6 : FOR t = 1 TO 500 : NEXT t
: RETURN
320 LOCATE 1,1 : PRINT e$ : PRINT e$ : PRINT e$ :
PRINT e$ : PRINT e$ : RETURN
400 LOCATE 18,6 : INK 1,6 : PRINT CHR$(209)CHR$(21
1) : PRINT TAB(18)CHR$(209)CHR$(211) : PRINT TAB(1
8)CHR$(209)CHR$(211)
402 GOSUB 300 : GOTO 160
405 LOCATE 18,9 : INK 2,26 : PRINT CHR$(214)CHR$(2
15)
410 LOCATE 17,10 : PRINT CHR$(214)CHR$(143)CHR$(14
3)CHR$(215) : GOSUB 300 : GOTO 160
415 INK 2,26 : FOR f = 0 TO 3 : FOR g = 0 TO 5 : L
OCATE 17+f,11+g : PRINT CHR$(143) : NEXT g : NEXT
f
420 GOSUB 300 : GOTO 160
430 INK 2,26 : FOR f = 0 TO 3 : FOR g = 0 TO 5 : L
OCATE 17+f,17+g : PRINT CHR$(143) : NEXT g : NEXT
f
435 GOSUB 300 : GOTO 160
445 INK 2,26 : LOCATE 16,15 : PRINT CHR$(214) : LO
CATE 15,16 : PRINT CHR$(214)CHR$(143)
446 FOR f = 0 TO 1 : FOR g = 0 TO 5 : LOCATE 15+f,
17+g : PRINT CHR$(143) : NEXT g : NEXT f
447 GOSUB 300 : GOTO 160
450 INK 2,26 : LOCATE 21,15 : PRINT CHR$(215) : LO
CATE 21,16 : PRINT CHR$(143)CHR$(215)
455 FOR f = 0 TO 1 : FOR g = 0 TO 5 : LOCATE 21+f,
17+g : PRINT CHR$(143) : NEXT g : NEXT f
460 GOSUB 300 : GOTO 160
475 PEN 3 : INK 3,19 : FOR f = 0 TO 1 : LOCATE 19,
12+f : PRINT CHR$(143) : LOCATE 18,16+f : PRINT CH
R$(143) : NEXT f
480 GOSUB 300 : GOTO 160
490 PEN 1 : INK 1,6 : FOR f = 0 TO 2 : LOCATE 16+f
,23 : PRINT CHR$(204) : LOCATE 19+f,23 : PRINT CHR
$(205) : NEXT f
495 FOR f = 0 TO 3 : LOCATE 15+f,24 : PRINT CHR$(2
04) : LOCATE 19+f,24 : PRINT CHR$(205) : LOCATE 14
+f,25 : PRINT CHR$(204) : LOCATE 20+f,25 : PRINT C
HR$(205) : NEXT f
500 GOSUB 300 : GOTO 160
505 INK 3,19 : ORIGIN 0,176 : DRAW 75,64 : DRAW 10
5,16 : DRAW 135,16 : DRAW 165,48 : DRAW 195,48 : D
RAW 254,0 : PLOT 320,16 : DRAW 346,48 : DRAW 406,4
8
508 DRAW 435,0 : DRAW 495,0 : DRAW 540,80 : DRAW 6
```

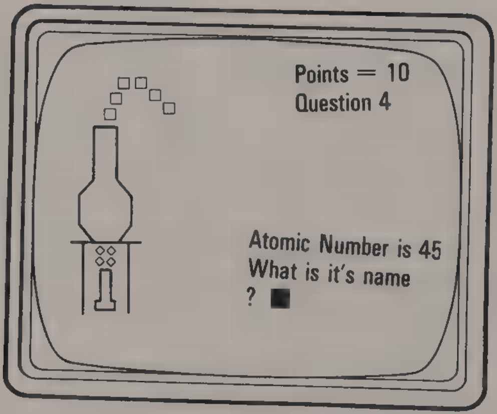
```
15,80
510 GOSUB 300 : GOTO 160
520 INK 2,26 : LOCATE 24,2 : PRINT CHR$(238) : LOC
ATE 36,2 : PRINT CHR$(238) : LOCATE 29,3 : PRINT C
HR$(238) : LOCATE 3,8 : PRINT CHR$(238)
525 LOCATE 13,8 : PRINT CHR$(238) : LOCATE 9,7 : P
RINT CHR$(238) : LOCATE 32,6 : PRINT CHR$(238)
530 GOSUB 300 : GOSUB 320 : GOTO 800
800 FOR m = 1 TO 5 : FOR n = 1 TO 7 : BORDER INT(R
ND*27) : SOUND 1,1073,20,n : NEXT n : NEXT m
805 BORDER 0 : PAPER 0 : INK 0,0
810 FOR j = 0 TO 30 : LOCATE 1+j,1 : PRINT "BLAST
OFF" : LOCATE 1+j,1 : PRINT "         " : NEXT j
812 CLS : PEN 2 : INK 2,26 : FOR w = 1 TO 50 : LOC
ATE INT(RND*39)+1,INT(RND*24)+1 : PRINT "*" : NEXT
 w
815 PEN 1 : INK 1,6 : FOR p = 0 TO 24 : LOCATE 20,
25-p : PRINT CHR$(239) : FOR t = 1 TO 50 : NEXT t
: LOCATE 20,25-p : PRINT CHR$(32)
817 SOUND 1,804,10,5 : NEXT p
820 LOCATE 14,12 : PRINT "EN ROUTE TO MARS" : END
```

PERIODIC TABLE

STUDENTS- This is an extensive program which not only can be used to test your knowledge of the chemical elements but can also be used as a reference. Areas covered are the names of the chemical elements with their symbols, atomic numbers and atomic masses.

The program begins by showing you a menu of seven alternatives:-

1) the brief history
2) the name, symbol, atomic mass or the atomic weight of any element
3) the Periodic Table in Period groups
4) the Table of Transitional Elements
5) the Table of Rare Elements
6) The Actinide series of elements and the artifical or man-made elements
7) test your knowledge of the elements.



```
Points = 10
Question 4

Atomic Number is 45
What is it's name
? ■
```

TYPING TIP

This may be a long program to type in but it is well worth persevering, after all, there are seven programs in one here! Copy your data out, with spaces, commas, upper (capital) and lower (small) case letters. In line 12 make sure that e$ has 6 spaces and f$ has 5 spaces.

PROGRAMMING HINT - a$ = INKEY$

Throughout the listings in this book you will recognise the command:-

```
415 a$ = INKEY$ : IF a$ = "" THEN 415
```

This line (the line number will of course vary) instructs the computer to wait for an entry from the keyboard and is useful if you want to hold a program at a given point, whilst perhaps information is read from the screen. After a key has been pressed, the computer responds according to the program instructions. If no key is pressed (i.e. a$ gives an empty string shown by ""), then the program returns to the beginning of the line and waits.

```
1 REM periodic table
10 DIM a(103) : DIM b$(103) : DIM c$(103) : DIM d(
103)
12 e$ = "      " : f$ = "     "
20 FOR e = 0 TO 102
25 READ a(e) : READ b$(e) : READ c$(e) : READ d(e)
30 NEXT e
40 PEN 1 : INK 1,0 : PEN 2 : INK 2,24 : PEN 3 : IN
K 3,26 : PEN 0 : INK 0,15
50 CLS : GOSUB 450 : GOSUB 480
200 WINDOW #1,1,18,6,25
202 WINDOW #2,19,40,1,25
204 WINDOW #3,1,18,1,5
206 CLS #1 : CLS #2 : CLS #3 : BORDER 0 : PAPER #1
,1 : PAPER #2,1 : PAPER #3,1
208 GOSUB 750
220 GOSUB 900
230 PRINT #2,"You have had 15" : PRINT #2,"questio
ns." : PRINT #2,"You scored ";r : PRINT #2,"points
." : PRINT #2,"You will now return tothe menu."
235 FOR t = 1 TO 4000 : NEXT t : GOTO 480
270 CLS : BORDER 7 : PAPER 1 : PEN 3 : PRINT "The
Actinide and Artificial Elements" : PRINT : GOSUB
630 : PRINT : PEN 0 : FOR f = 88 TO 102 : PRINT a(
f);f$;b$(f);f$;c$(f);f$;d(f) : NEXT f : GOSUB 600
: RETURN
300 CLS : BORDER 18 : PAPER 1 : PEN 2 : PRINT "Tab
le of Rare Earth Elements" : PRINT : GOSUB 630
```

```
305 PEN 0 : FOR f = 56 TO 70 : PRINT a(f);f$;b$(f)
;f$;c$(f);f$;d(f) : NEXT f : GOSUB 600 : RETURN

330 CLS : BORDER 5 : PAPER 1 : PEN 2 : PRINT "Tabl
e of Transitional Elements" : GOSUB 630 : FOR f =
20 TO 29 : GOSUB 620 : NEXT f : GOSUB 600
331 CLS : BORDER 5 : PAPER 1 : PEN 2 : PRINT "Tabl
e of Transitional Elements" : GOSUB 630 : FOR f =
38 TO 47 : GOSUB 620 : NEXT f : GOSUB 600
332 CLS : BORDER 5 : PAPER 1 : PEN 2 : PRINT "Tabl
e of Transitional Elements" : GOSUB 630 : f = 56 :
 GOSUB 620 : PRINT : FOR f = 71 TO 79 : GOSUB 620
: NEXT f : GOSUB 600
335 RETURN
340 CLS : PEN 3 : PRINT "Period 1" : PRINT : GOSUB
 630 : PRINT : FOR f = 0 TO 1 : GOSUB 620 : NEXT f
 : GOSUB 600
350 CLS : PEN 3 : PRINT "Period 2" : PRINT : GOSUB
 630 : PRINT : FOR f = 2 TO 9 : GOSUB 620 : NEXT f
 : GOSUB 600
355 CLS : PEN 3 : PRINT "Period 3" : PRINT : GOSUB
 630 : PRINT : FOR f = 10 TO 17 : GOSUB 620 : NEXT
 f : GOSUB 600
360 CLS : PEN 3 : PRINT "Period 4" : PRINT : GOSUB
 630 : PRINT : FOR f = 18 TO 19 : GOSUB 620 : NEXT
 f : FOR f = 30 TO 35 : GOSUB 620 : NEXT f : GOSUB
 600
365 CLS : PEN 3 : PRINT "Period 5" : PRINT : GOSUB
 630 : PRINT : FOR f = 36 TO 37 : GOSUB 620 : NEXT
 f : FOR f = 48 TO 53 : GOSUB 620 : NEXT f : GOSUB
 600
370 CLS : PEN 3 : PRINT "Period 6" : PRINT : GOSUB
 630 : PRINT : FOR f = 54 TO 55 : GOSUB 620 : NEXT
 f : FOR f = 80 TO 85 : GOSUB 620 : NEXT f : GOSUB
 600
375 CLS : PEN 3 : PRINT "Period 7": PRINT : GOSUB
630 : PRINT : FOR f = 86 TO 87 : GOSUB 620 : NEXT
f : GOSUB 600
380 RETURN
400 CLS : BORDER 6 : PAPER 1 : PEN 3 : PRINT "HIST
ORY OF THE CHEMICAL ELEMENTS" : PRINT : PEN 2 : PR
INT "The early Greek alchemists and in       parti
cular Empedocles said that the"
402 PRINT "elements of which all things are made
 are earth, air, wind and fire. The      alchemist
s discovered that the true     chemical elements c
ould not be split."
404 PRINT "The elements the alchemists knew were
 gold,silver,copper,iron,lead,tin,mercury,antimony
,sulphur,arsenic,phosphorus and carbon."
```

```
406 PRINT "In the 18th century when chemistry was
 becoming a science chemists began to    discover
new elements. At first they    found 92 but more r
ecently chemists havelearned to make 11 more new e
lements."
410 PEN 3 : PRINT : PRINT "Hit any key to continue
"
415 a$ = INKEY$ : IF a$ = "" THEN 415
420 RETURN
450 BORDER 0 : PAPER 1
455 PEN 2 : LOCATE 10,1 : PRINT "THE  PERIODIC  TA
BLE"
460 PEN 3 : PRINT : PRINT "This program will help
you practice your knowledge of the chemical elemen
ts and their :"
465 LOCATE 10,7 : PRINT "name" : LOCATE 10,8 : PRI
NT "symbol" : LOCATE 10,9 : PRINT "atomic number"
: LOCATE 10,10 : PRINT "atomic mass"
470 PEN 2 : PRINT : PRINT : PRINT "hit any key to
continue"
475 a$ = INKEY$ : IF a$ = "" THEN 475
477 RETURN
480 CLS : PEN 3 : LOCATE 18,1 : PRINT "MENU" : PRI
NT : PRINT "Do you want to see :": PRINT : PRINT "
1) the brief history?"
482 PRINT : PRINT "2) the name, symbol, atomic mas
s or the    atomic weight of any element?" : PRINT
 : PRINT "3) the Periodic Table in Period groups?"
 : PRINT : PRINT "4) the Table of Transitional Ele
ments?"
484 PRINT : PRINT "5) the Table of rare elements?"
 : PRINT : PRINT "6) the actinide series of elemen
ts and     the artificial or man made elements?"
485 PRINT : PRINT "7) test your knowledge of the e
lements?"
486 PRINT : PRINT : PEN 2 : PRINT "press the numbe
r that you require"
488 a$ = INKEY$ : IF a$ = "" THEN 488
490 IF a$ = "1" THEN GOSUB 400 : GOTO 480
491 IF a$ = "2" THEN GOSUB 700 : GOTO 480
492 IF a$ = "3" THEN GOSUB 340 : GOTO 480
493 IF a$ = "4" THEN GOSUB 330 : GOTO 480
494 IF a$ = "5" THEN GOSUB 300 : GOTO 480
495 IF a$ = "6" THEN GOSUB 270 : GOTO 480
496 IF a$ = "7" THEN GOSUB 200 : GOTO 480
497 PRINT : PRINT "A number under 8" : FOR t = 1 T
O 3000 : NEXT t : GOTO 480
500 DATA 1,H,Hydrogen,1,2,He,Helium,4,3,Li,Lithium
,7,4,Be,Beryllium,9,5,B,Boron,11,6,C,Carbon,12,7,N
,Nitrogen,14,8,O,Oxygen,16,9,F,Fluorine,19,10,Ne,N
```

```
eon,20,11,Na,Sodium,23,12,Mg,Magnesium,24,13,Al,Al
uminium,27,14,Si,Silicon,28,15,P,Phosphorus,31
510 DATA 16,S,Sulphur,32,17,Cl,Chlorine,35,18,Ar,A
rgon,40,19,K,Potassium,39,20,Ca,Calcium,40,21,Sc,S
candium,45,22,Ti,Titanium,48,23,V,Vanadium,51,24,C
r,Chromium,52
520 DATA 25,Mn,Manganese,55,26,Fe,Iron,56,27,Co,Co
balt,59,28,Ni,Nickel,59,29,Cu,Copper,64,30,Zn,Zinc
,65,31,Ga,Gallium,70,32,Ge,Germanium,73,33,As,Arse
nic,75,34,Se,Selenium,79
530 DATA 35,Br,Bromine,80,36,Kr,Krypton,84,37,Rb,R
ubidium,85,38,Sr,Strontium,88,39,Y,Yttrium,89,40,Z
r,Zirconium,91,41,Nb,Niobium,93,42,Mo,Molybdenum,9
6,43,Tc,Technetium,98
540 DATA 44,Ru,Ruthenium,101,45,Rh,Rhodium,103,46,
Pd,Palladium,106,47,Ag,Silver,108,48,Cd,Cadmium,11
2,49,In,Indium,115,50,Sn,Tin,119
550 DATA 51,Sb,Antimony,122,52,Te,Tellurium,128,53
,I,Iodine,127,54,Xe,Xenon,131,55,Cs,Caesium,133,56
,Ba,Barium,137,57,La,Lanthanum,139,58,Ce,Cerium,14
0,59,Pr,Praseodymium,141,60,Nd,Neodymium,144,61,Pm
,Promethium,147
560 DATA 62,Sm,Samarium,150,63,Eu,Europium,152,64,
Gd,Gadolinium,157,65,Tb,Terbium,159,66,Dy,Dysprosi
um,162,67,Ho,Holmium,165,68,Er,Erbium,167,69,Tm,Th
ulium,169,70,Yb,Ytterbium,173
570 DATA 71,Lu,Lutetium,175,72,Hf,Hafnium,178,73,T
a,Tantalum,181,74,W,Tungsten,184,75,Re,Rhenium,186
,76,Os,Osmium,190,77,Ir,Iridium,192,78,Pt,Platinum
,195,79,Au,Gold,197,80,Hg,Mercury,201,81,Ti,Thalli
um,204,82,Pb,Lead,207
580 DATA 83,Bi,Bismuth,209,84,Po,Polonium,210,85,A
t,Astatine,210,86,Rn,Radon,222,87,Fr,Francium,223,
88,Ra,Radium,226,89,Ac,Actinium,227,90,Th,Thorium,
232,91,Pa,Protactinium,231,92,U,Uranium,238,93,Np,
Neptunium,237
590 DATA 94,Pu,Plutonium,242,95,Am,Americium,243,9
6,Cm,Curium,247,97,Bk,Berkelium,247,98,Cf,Californ
ium,251,99,Es,Einsteinium,254,100,Fm,Fermium,253,1
01,Md,Mendelevium,256,102,No,Nobelium,254,103,Lw,L
awrencium,257
600 PRINT : PRINT "Hit any key to continue"
605 a$ = INKEY$ : IF a$ = "" THEN 605
610 RETURN
620 PEN 0 : PRINT a(f);e$;b$(f);e$;c$(f);e$;d(f) :
 PRINT : RETURN
630 PRINT "At.No. Symbol    Name        At.Mass" :
RETURN
700 CLS : BORDER 0 : PAPER 1 : PEN 2 : PRINT "Whic
h atomic number do you want details  of?" : PRINT
```

```
: PRINT : INPUT at
720 PRINT : PRINT a(at-1);f$;b$(at-1);f$;c$(at-1);
f$;d(at-1)
725 GOSUB 600 : RETURN
750 CLS #1 : PAPER #1,1 : PEN #1,3 : FOR k = 0 TO
1 : FOR m = 0 TO 5 : LOCATE #1,7+k,1+m : PRINT #1,
CHR$(143) : NEXT m : NEXT k
760 FOR k = 0 TO 3 : FOR m = 0 TO 3 : LOCATE #1,6+
k,7+m : PRINT #1,CHR$(143) : NEXT m : NEXT k
770 LOCATE #1,6,6 : PRINT #1,CHR$(214) : LOCATE #1
,9,6 : PRINT #1,CHR$(215) : LOCATE #1,5,7 : PRINT
#1,CHR$(214) : LOCATE #1,10,7 : PRINT #1,CHR$(215)
 : LOCATE #1,5,10 : PRINT #1,CHR$(213) : LOCATE #1
,6,11 : PRINT #1,CHR$(213)
780 LOCATE #1,10,10 : PRINT #1,CHR$(212) : LOCATE
#1,9,11 : PRINT #1,CHR$(212) : FOR k = 0 TO 1 : LO
CATE #1,5,8+k : PRINT #1,CHR$(143) : LOCATE #1,10,
8+k : PRINT #1,CHR$(143) : LOCATE #1,7+k,11 : PRIN
T #1,CHR$(143) : NEXT k
790 FOR k = 0 TO 9 : LOCATE #1,3+k,12 : PRINT #1,C
HR$(208) : NEXT k :  FOR k = 0 TO 7 : LOCATE #1,5,
13+k : PRINT #1,CHR$(211) : LOCATE #1,10,13+k : PR
INT #1,CHR$(209) : NEXT k
800 LOCATE #1,5,12 : PRINT #1,CHR$(212) : LOCATE #
1,10,12 : PRINT #1,CHR$(213)
810 PEN #1,2 : FOR k = 0 TO 4 : LOCATE #1,7,15+k :
 PRINT #1,CHR$(138)CHR$(133) : NEXT k : LOCATE #1,
7,20 : PRINT #1,CHR$(143)CHR$(143)
820 RETURN
830 CLS #3 : PEN #3,3 : GOSUB 850 : GOSUB 846 : CL
S #3 : GOSUB 850 : GOSUB 845 : CLS #3 : GOSUB 850
: GOSUB 844 : CLS #3 : GOSUB 850 : GOSUB 843 : CLS
 #3 : GOSUB 850 : GOSUB 842 : CLS #3 : GOSUB 850 :
 GOSUB 841 : GOSUB 850 : RETURN
832 p= 0
841 LOCATE #3,17,3 : PRINT #3,CHR$(143)
842 LOCATE #3,15,2 : PRINT #3,CHR$(143)
843 LOCATE #3,13,1 : PRINT #3,CHR$(143)
844 LOCATE #3,11,1 : PRINT #3,CHR$(143)
845 LOCATE #3,9,2 : PRINT #3,CHR$(143)
846 LOCATE #3,8,4 : PRINT #3,CHR$(143) : FOR t = 1
 TO 400 : NEXT t : RETURN
850 FOR q = 1 TO 2 : FOR k = 0 TO 1 : PEN #1,0 : L
OCATE #1,7,13+k : PRINT #1,CHR$(202)CHR$(202) : NE
XT k : SOUND 1,2703,20,6,0,0,6 : FOR t = 1 TO 150
: NEXT t
852 IF q = 2 THEN 865
860 FOR k = 0 TO 1 : LOCATE #1,7,13+k : PRINT #1,C
HR$(32)CHR$(32) : NEXT k : FOR t = 1 TO 150 : NEXT
 t
```

```
865 NEXT q : RETURN
900 PEN #2,2 : PRINT #2,"You will have 15       que
stions. Points are awarded for correct   answers."
 : PRINT #2,"Remember your capital letters!" : FOR
 t = 1 TO 4000 : NEXT t
905 v = 0 : r = 0
907 CLS #2 : v = v+1
908 IF v = 16 THEN 1102
910 PEN #2,3 : LOCATE #2,1,2 : PRINT #2,"Points =
";r : LOCATE #2,1,4 : PRINT #2,"Question ";v
915 GOSUB 830
920 n = INT(RND*103)
930 p = INT(RND*4)
935 ON p GOTO 940,960,980,1000
940 LOCATE #2,1,10 : PRINT #2,"Name is ";c$(n) : P
RINT #2 : PRINT #2,"What is the symbol?"
943 PRINT #2 : INPUT #2,ws$
945 w$ = "" : w$ = w$ + b$(n)
946 IF ws$ = w$ THEN GOSUB 1100 : GOTO 950
948 PRINT #2,"no"
950 GOSUB 1150 : GOTO 907
960 LOCATE #2,1,10 : PRINT #2,"Atomic Number is ";
a(n) : PRINT #2 : PRINT #2,"What is it's name?"
963 PRINT #2 : INPUT #2,ws$
965 w$ = "" : w$ = w$ + c$(n)
966 IF ws$ = w$ THEN GOSUB 1100 : GOTO 970
968 PRINT #2,"no"
970 GOSUB 1150 : GOTO 907
980 LOCATE #2,1,10 : PRINT #2,"The Symbol is ";b$(
n) : PRINT #2 : PRINT #2,"What is it's name?"
983 PRINT #2 : INPUT #2,ws$
985 w$ = "" : w$ = w$ + c$(n)
986 IF ws$ = w$ THEN GOSUB 1100 : GOTO 990
988 PRINT #2,"no"
990 GOSUB 1150 : GOTO 907
1000 LOCATE #2,1,10 : PRINT #2,"The Atomic Mass is
 ";d(n) : PRINT #2 : PRINT #2,"What is it's name?"
1003 PRINT #2 : INPUT #2,ws$
1005 w$ = "" : w$ = w$ + c$(n)
1006 IF ws$ = w$ THEN GOSUB 1100 : GOTO 1010
1010 PRINT #2,"no"
1012 GOSUB 1150 : GOTO 907
1100 PRINT #2,"good" : r = r + (INT(RND*5)+1)*2
1102 RETURN
1150 FOR t = 1 TO 2000 : NEXT t : RETURN
```

CROCGRAMS -

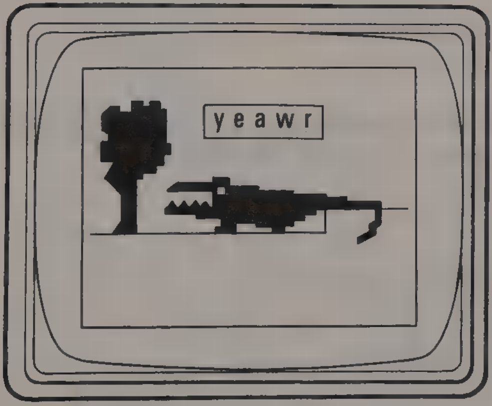
anagrams with Croc

CROCGRAMS **CROCGRAMSTWO** **CROCGRAMSTHREE**

(age 10-15) (age 9-13) (age 7-11)

PARENTS- this novel program can be used to enhance children's language development as they play the traditional game of anagrams, whilst learning to manipulate letters to find the hidden word and at the same time improve their vocabulary and spelling. There is a choice of three programs depending on the age of your child. Read the tips and hints for information.

CHILDREN- meet the magical crocodile who blows out letters, BUT, they are all jumbled up. You must put them in the correct order to make a word. There is no need to press ENTER after each letter and the computer will help you by erasing an incorrect letter, until you finally build the word. Your screen will look like this:-



TYPING TIPS- the program listing is for a student of about 10 to 15 years of age but also listed in these tips is the DATA for the other two programs, so if you require either of these instead then choose which set and type that one in. But you must always have

100 words in your `DATA` lines otherwise the program will not work. With this in mind you may want to work out 100 words of your own.

CROCGRAMSTWO- DATA

```
700 DATA city,prey,fairy,danger,engine,sudden,matter,supper,happen,borrow,butter,
ribbon,choose,cheese,someone,breakfast,porch,more,store,picture,sure,daisy,babies
710 DATA gypsy,patch,truth,hollow,friendly,perhaps,person,longer,biting,giving,
market,people,smart,remember,worry,children,enough,touch,giant,lion
720 DATA motor,taste,soup,sugar,shock,even,track,present,finish,surprise,nurse,
bench,branch,doctor,ocean,heavy,safety,candle,printer,river
730 DATA suitable,juice,hospital,poor,caught,police,roller,once,almost,laugh,anybody,
everyone,custom,enjoy,often,retire,towards,though,package,factory
740 DATA through,within,recorder,thirsty,indeed,needle,speech,foolish,peace,weak,
pointing,coin,leather,meant,steady,already,brain
```

CROCGRAMSTHREE-DATA

```
700 DATA last,faster,stand,those,these,father,mother,cage,real,seat,hear,near,clear,
fear,eat,cream,team,lead,instead,push,full,thick,thump,stir,bird,shirt
710 DATA sheep,shoe,show,murder,burn,hurt,stout,out,found,mouse,house,were,
because,begin,any,anyone,where,wander,few,stew,knew,never,should,would,could,
port,report,bleed
720 DATA forest,lesson,both,warm,belong,shine,drive,wise,wife,spite,price,treat,
reach,leave,scream,shame,blade,mistake,again,afraid,nearest,twist,write,divide,bare,
dance
730 DATA pencil,march,right,high,might,whose,coal,road,throat,toast,afternoon,
craftsman,thumb,knock,smash,poison,ice,twice,shoot,away
```

PROGRAMMING HINT - MID$

This is a useful command for extracting letters from a string variable. It is used in this program to rearrange the words into an anagram.

Try this program:-

```
10 a$ = "Amstrad Computing"

20 PRINT MID$(a$,4,2)
```

Did you get `'tr'` on the screen? Good. How did this happen?

Line 10 gives a$ the string `"Amstrad Computing"`.

Line 20 instructs the computer to look at that statement and to take the fourth letter in a$, which is ‘t’ and to print two letters beginning with ‘t’, hence ‘tr’ is printed.

Now alter line 20 to read:-

```
20 PRINT MID$(a$,INT(RND*17)+1,INT(RND*17)+1)
```

and add line 30

```
30 GOTO 20
```

Now Run the program. Stop it and see what is on the screen. Try to work out what is happening.

```
1 REM crocgrams
2 MODE 1
3 DIM g$(99)
5 y$ = CHR$(143)+CHR$(143)+CHR$(143)+CHR$(143)+CHR
$(143) : z$ = CHR$(143)+CHR$(143)+CHR$(143)+CHR$(1
43)
6 x$ = CHR$(32)+CHR$(32)+CHR$(32)+CHR$(143) : w$ =
 CHR$(210)+CHR$(210)+CHR$(210) : v$ = CHR$(95)+CHR
$(95)+CHR$(95) : u$ = CHR$(140)+CHR$(140)+CHR$(140
) : t$ = CHR$(198)+CHR$(198)+CHR$(198)+CHR$(198)+C
HR$(198)
7 r$ = CHR$(131)+CHR$(131)+CHR$(131) : s$ = CHR$(2
08)+CHR$(208)+CHR$(208)+CHR$(208)+CHR$(208)
8 GOSUB 350
10 BORDER 20 : INK 0,14 : INK 1,18 : INK 2,15 : IN
K 3,6
20 WINDOW #1,1,40,1,16
22 WINDOW #2,1,40,17,25
24 WINDOW #3,27,40,15,16
26 WINDOW #4,13,27,3,7
30 PAPER #1,0 : PAPER #2,2 : PAPER #3,2 : PAPER #4
,3
32 CLS #1 : CLS #2 : CLS #3 : CLS #4 : GOSUB 570 :
 GOSUB 600 : GOSUB 620
35 LOCATE #4,3,3 : PRINT #4,"CROCOGRAMS"
36 LOCATE #2,3,4 : PRINT #2,"FIND THE WORDS FROM T
HESE ANAGRAMS" : FOR t = 1 TO 3000 : NEXT t
40 CLS #1 : CLS #2 : CLS #3 : CLS #4
50 GOSUB 570 : GOSUB 600 : GOSUB 620
52 CLS #4 : e = INT(RND*100) : word$ = "" : word$
= word$ + g$(e)
55 GOSUB 400 : GOSUB 300 : GOSUB 330
67 word$ = "" : word$ = word$ + g$(e)
70 FOR h = 1 TO d%
72 LOCATE #4,2+h,4
```

```
75 a$ = INKEY$ : IF a$ = "" THEN 75
77 PRINT #4,a$
80 FOR t = 1 TO 500 : NEXT t
85 IF MID$(word$,h,1) = a$ THEN 90 ELSE 95
90 NEXT h
92 GOTO 100
95 LOCATE #4,3+h-1,4 : PRINT #4,"-" : GOTO 72
100 FOR bo = 1 TO 30 : BORDER INT(RND*27) : SOUND
1,INT(RND*3822),30,6 : FOR t = 1 TO 150 : NEXT t :
 NEXT bo : FOR t = 1 TO 800 : NEXT t
150 GOTO 52
300 FOR mm = 1 TO d%
302 n$ = MID$(anagram$,mm,1)
304 LOCATE #1,6,14 : PEN #1,1 : PRINT #1,n$ : GOSU
B 320 : LOCATE #1,6,14 : PRINT #1," "
306 FOR mp = 0 TO 6 STEP 2 : LOCATE #1,9,11-mp : P
RINT #1,n$ : GOSUB 320 : LOCATE #1,9,11-mp : PRINT
 #1," " : NEXT mp : LOCATE #4,2+mm,2 : PEN #4,1 :
PRINT #4,n$ : GOSUB 320 : NEXT mm
308 RETURN
320 SOUND 1,3034,20,6 : FOR t = 1 TO 200 : NEXT t
: RETURN
330 LOCATE #4,3,4 : FOR cd = 1 TO d% : PRINT #4,"-
"; : NEXT cd : RETURN
350 FOR ml = 0 TO 99
360 READ g$(ml) : NEXT ml : RETURN
400 anagram$ = "" : d% = LEN(word$) : FOR b = 1 TO
 d%
410 c = INT(RND*d%)+1
420 IF MID$(word$,c,1) <> " " THEN anagram$ = anag
ram$ + MID$(word$,c,1) : LET word$ = LEFT$(word$,c
-1)+" "+RIGHT$(word$,LEN(word$)-c)ELSE 410
430 NEXT b : RETURN
570 LOCATE #1,3,3 : PEN #1,1
575 PRINT #1,CHR$(210)CHR$(140)CHR$(142)CHR$(143)C
HR$(132)
580 PRINT #1,CHR$(209);y$;CHR$(133) : PRINT #1,CHR
$(138);y$;CHR$(133)
585 PRINT #1,CHR$(138);y$;CHR$(133) : PRINT #1,CHR
$(138);y$;CHR$(143)
590 PRINT #1,CHR$(130);y$;CHR$(212) : PRINT #1,CHR
$(136);z$;CHR$(135) : PRINT #1,CHR$(138);z$;CHR$(1
29)
595 PRINT #1,CHR$(130)CHR$(143)CHR$(143)CHR$(143)C
HR$(212)
596 RETURN
600 LOCATE #1,2,12 : PEN #1,2
605 PRINT #1,CHR$(213)CHR$(143)CHR$(143) : PRINT #
1,CHR$(32)CHR$(32)CHR$(213)CHR$(143)
610 PRINT #1,x$ : PRINT #1,x$ : PRINT #1,CHR$(32)C
```

```
HR$(32)CHR$(214)CHR$(143) : RETURN
620 LOCATE #1,7,13 : PEN #1,3 : PRINT #1,CHR$(214)
;z$;CHR$(135)CHR$(141)CHR$(140)CHR$(140);w$;v$
622 LOCATE #1,7,14 : PRINT #1,t$;CHR$(143)CHR$(143
);z$;z$;z$;CHR$(141);u$;w$;w$
625 LOCATE #1,7,15 : PRINT #1,r$;CHR$(139);y$;y$;y
$;CHR$(131)
630 LOCATE #1,13,16 :PRINT #1,CHR$(142)CHR$(143)CH
R$(208)CHR$(208)CHR$(208);r$;CHR$(143)CHR$(135)CHR
$(208)CHR$(208)
635 LOCATE #3,1,1 : PEN #3,3 : PRINT #3,CHR$(131)C
HR$(208);s$;CHR$(208)CHR$(139) : LOCATE #3,9,2 : P
RINT #3,CHR$(134)
640 LOCATE #2,34,1 : PEN #2,3 : PRINT #2,CHR$(204)

650 RETURN
700 DATA enter,offer,border,perfect,chapter,hammer
,answer,power,different,camera,modern,interest,pow
erful,awful,wonderful,bitter,daughter,secret,secon
d,space,grace,suppose
710 DATA escape,admire,advice,spare,share,overtime
,define,survive,arrive,alive,arise,damage,flood,bl
ood,passage,manage,yesterday,chart
720 DATA depart,harmful,parcel,chance,distance,ent
rance,stronger,finger,gentleman,arrange,parent,mov
ement,double,courage,evening,darkness,crowd,shadow
,flesh,course,bought
730 DATA enemy,promise,family,merry,wrapping,heart
less,stretch,kitchen,tomorrow,cotten,narrow,dressi
ng,appear,attack,discover,electric,equal,quick,squ
are,adventure,scratch
740 DATA jewel,whisper,kettle,address,biscuit,init
ials,newspaper,beautiful,capsule,curtain,amongst,i
nvitation,notice,platform,inspect,weary,treasure,c
upboard
```

STAIRWAY TO SUCCESS

A game for two players.

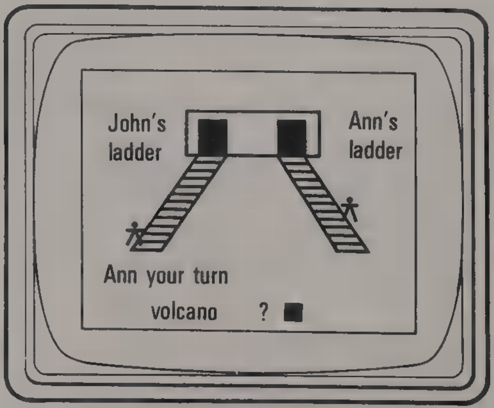
PARENTS- a program designed to help children learn the plurals of some of our nouns. Our language is very complicated and in order to make a word plural it is, unfortunately, not always just a matter of putting an 's' on the end of it. In this program, the child will meet words which require the addition of 's', 'es', 'ies' and 'e'; where it is necessary to change part of the word (e.g. mouse, mice); and even words where the singular and plural remain the same.

CHILDREN- climb the stairway to success. Who will be the first to open the door at the top of the ladder? Only by making the given singular(*1) word plural(*2), will you be able to move up the ladder! The program begins by asking you your names and then gives you a ladder each. You will be asked, in turn, the plural of a word. You must type in your answer and then press ENTER . With each correct answer, you will climb the next rung of the ladder.

*1 'singular' means one e.g. one book

*2 'plural' means more than one e.g. lots of books.

Your screen will look like this:-



TYPING TIP

The 75 pairs of singular-plural words found between lines 300 and 325 can be altered by deleting these lines and inserting a further set of DATA. There must be 75 pairs of words otherwise the program will not work.

PROGRAMMING HINT - `LEFT$`

`LEFT$` is a function used to extract characters to the left of a given string expression.

Try this program:-

```
10 CLS

20 A$ = "London"

30 PRINT LEFT$(A$,3)
```

Did you get "Lon" on the screen? The program PRINTed three letters of A$ beginning from the left.

Hence,

```
40 PRINT LEFT$(A$,5)
```

added to the program would `PRINT` the first five letters of A$ beginning from the left.

Try it and see.

Look at lines 95 to 107 in the program listing. The `LEFT$` is used to make sure that only the first four letters of the players names are used.

```
1 REM stairway
10 DIM pl$(74) : DIM pls$(74)
15 FOR p = 0 TO 73 : READ pl$(p) : READ pls$(p) :
NEXT p
20 PEN 0 : INK 0,0 : PEN 1 : INK 1,6 : PEN 2 : INK
 2,24 : PEN 3 : INK 3,20
25 WINDOW #1,12,27,2,7 : PAPER #1,3
26 WINDOW #2,1,40,1,25
27 WINDOW #3,1,40,20,25
30 CLS
35 GOSUB 400 : GOSUB 430 : GOSUB 455
60 PEN #2,1 : LOCATE #2,16,14 : PRINT #2,"C L I M
B" : LOCATE #2,12,16 : PRINT #2,"T H E  L A D D E
R" : LOCATE #2,19,18 : PRINT #2,"o f" : LOCATE #2,
14,20 : PRINT #2,"S U C C E S S"
```

```
70 FOR h = 1 TO 10 : SOUND 1,956,20,7 : SOUND 2,16
,20,7 : BORDER INT(RND*27) : FOR t = 1 TO 200 : NE
XT t : NEXT h
80 BORDER 16 : CLS #2 : CLS #1 : GOSUB 400 : GOSUB
 430 : GOSUB 455
90 LOCATE #2,1,20 : PRINT #2,"I need your initials
. Player 1, give me yours but don't use more than
4 letters."
95 LOCATE #2,1,22 : INPUT #2,na$
97 na$ = LEFT$(na$,4)
100 PRINT #2,"Player 2, give me yours (4 letters).
"
105 INPUT #2,nam$
107 nam$ = LEFT$(nam$,4)
110 na = 1 : nam = 1
130 CLS #1 : GOSUB 400 : GOSUB 430 : GOSUB 455 : G
OSUB 520
132 GOSUB 650 : GOSUB 470
133 GOSUB 700 : GOSUB 490
135 CLS #3
140 PEN #3,1 : PRINT #3,na$;" your turn"
145 r = INT(RND*74)
150 LOCATE #3,8,3 : PRINT #3,pl$(r)
155 LOCATE #3,25,3 : INPUT #3,ans$
160 IF ans$ <> pls$(r) THEN GOSUB 280 : GOTO 200
170 GOSUB 290 : GOSUB 480 : GOSUB 400 : na = na +
1
180 GOSUB 650 : GOSUB 470
190 IF na = 11 THEN 550
200 CLS #3 : PEN #3,3 : LOCATE #3,6,1 : PRINT #3,n
am$;" your turn"
205 r = INT(RND*74)
210 LOCATE #3,8,3 : PRINT #3,pl$(r)
220 LOCATE #3,25,3 : INPUT #3,ans$
230 IF ans$ <> pls$(r) THEN GOSUB 280 : CLS #3 : G
OTO 140
235 GOSUB 290 : GOSUB 500 : GOSUB 430 : nam = nam
+ 1
240 GOSUB 700 : GOSUB 490
245 IF nam = 11 THEN 600
250 GOTO 135
280 PRINT #3,"Sorry answer is ";pls$(r) : FOR t =
1 TO 3000 : NEXT t : RETURN
290 FOR w = 1 TO 10 : SOUND 1,32,20,7 : SOUND 2,20
25,20,7 : FOR t = 1 TO 200 : NEXT t : NEXT w : RET
URN
300 DATA abbey,abbeys,army,armies,assembly,assembl
ies,baby,babies,banjo,banjoes,battery,batteries,be
lief,beliefs,berry,berries,body,bodies,brief,brief
s,bully,bullies,buoy,buoys,butterfly,butterflies,c
```

```
alf,calves,cargo,cargoes,century,centuries
305 DATA chief,chiefs,chimney,chimneys,city,cities
,comedy,comedies,copy,copies,country,countries,cou
nty,counties,curio,curios,datum,data,daisy,daisies
,deer,deer,desperado,desperadoes,dictionary,dictio
naries
310 DATA dinghy,dinghies,domino,dominoes,donkey,do
nkeys,echo,echoes,elf,elves,enemy,enemies,erratum,
errata,factory,factories,goose,geese,guy,guys,half
,halves,halo,haloes,inferno,infernos,jockey,jockey
s
315 DATA knife,knives,lady,ladies,larva,larvae,las
so,lassos,leaf,leaves,life,lives,loaf,loaves,lorry
,lorries,madame,mesdames,missionary,missionaries,m
onkey,monkeys,mouse,mice,mummy,mummies,oasis,oases
,ox,oxen
320 DATA party,parties,photo,photos,piano,pianos,p
ony,ponies,potato,potatoes,radius,radii,roof,roofs
,salmon,salmon,self,selves,sky,skies,story,stories
,toe,toes
325 DATA tooth,teeth,tragedy,tragedies,try,tries,v
olcano,volcanoes,wife,wives
400 REM left-ladder
405 PLOT 15,96,2 : DRAW 195,288,2 : PLOT 45,96,2 :
 DRAW 225,288,2
410 FOR a = 1 TO 11 : PLOT 15+(15*a),96+(16*a) : D
RAW 45+(15*a),96+(16*a) : NEXT a
415 RETURN
430 REM right-ladder
435 PLOT 555,96,2 : DRAW 375,288,2 : PLOT 585,96,2
 : DRAW 405,288,2
440 FOR a = 1 TO 11 : PLOT 555-(15*a),96+(16*a),2
: DRAW 585-(15*a),96+(16*a),2 : NEXT a
445 RETURN
450 REM wall
455 CLS #1 : PEN #1,1 : FOR b = 0 TO 2 : FOR c = 0
 TO 4 : LOCATE #1,2+b,2+c : PRINT #1,CHR$(143) : L
OCATE #1,13+b,2+c : PRINT #1,CHR$(143) : NEXT c :
NEXT b
460 PEN #1,0 : LOCATE #1,4,4 : PRINT #1,CHR$(231)
: LOCATE #1,13,4 : PRINT #1,CHR$(231) : RETURN
470 REM l-man
475 PEN #2,1 : LOCATE #2,d,e : PRINT #2,CHR$(251)
: RETURN
480 REM l-man-off
485 LOCATE #2,d,e : PRINT #2,CHR$(32) : RETURN
490 REM r-man
495 PEN #2,1 : LOCATE #2,f,g : PRINT #2,CHR$(250)
: RETURN
500 REM r-man-off
```

```
505 LOCATE #2,f,g : PRINT #2,CHR$(32) : RETURN

520 LOCATE #2,2,7 : PEN #2,1 : PRINT #2,na$;"'s" :
 LOCATE #2,2,8 : PRINT #2,"ladder" : LOCATE #2,32,
7 : PRINT #2,nam$;"'s" : LOCATE #2,32,8 : PRINT #2
,"ladder"
525 RETURN
550 PEN #1,0 :FOR b = 0 TO 2 : FOR c = 0 TO 4 : LO
CATE #1,2+b,2+c : PRINT #1,CHR$(206) : NEXT c : NE
XT b : LOCATE #1,6,2 : PRINT #1,na$ : LOCATE #1,7,
4 : PRINT #1,"WINS" : GOSUB 290 : END
600 PEN #1,0 : FOR b = 0 TO 2 : FOR c = 0 TO 4 : L
OCATE #1,13+b,2+c : PRINT #1,CHR$(206) : NEXT c :
NEXT b : LOCATE #1,6,2 : PRINT #1,nam$ : LOCATE #1
,7,4 : PRINT #1,"WINS" : GOSUB 290 : END
650 IF na = 1 THEN d = 2 : e = 18
652 IF na = 2 THEN d = 3 : e = 17
654 IF na = 3 THEN d = 4 : e = 16
656 IF na = 4 THEN d = 5 : e = 15
658 IF na = 5 THEN d = 6 : e = 14
660 IF na = 6 THEN d = 7 : e = 13
662 IF na = 7 THEN d = 8 : e = 12
664 IF na = 8 THEN d = 9 : e = 11
666 IF na = 9 THEN d = 10 : e = 10
669 IF na = 10 THEN d = 11 : e = 9
670 IF na = 11 THEN d = 12 : e = 8
672 RETURN
700 IF nam = 1 THEN f = 36 : g = 18
702 IF nam = 2 THEN f = 35 : g = 17
704 IF nam = 3 THEN f = 34 : g = 16
706 IF nam = 4 THEN f = 33 : g = 15
708 IF nam = 5 THEN f = 32 : g = 14
710 IF nam = 6 THEN f = 31 : g = 13
712 IF nam = 7 THEN f = 30 : g = 12
714 IF nam = 8 THEN f = 29 : g = 11
716 IF nam = 9 THEN f = 28 : g = 10
718 IF nam = 10 THEN f = 27 : g = 9
720 IF nam = 11 THEN f = 26 : g = 8
722 RETURN
```

SEA-BATTLE

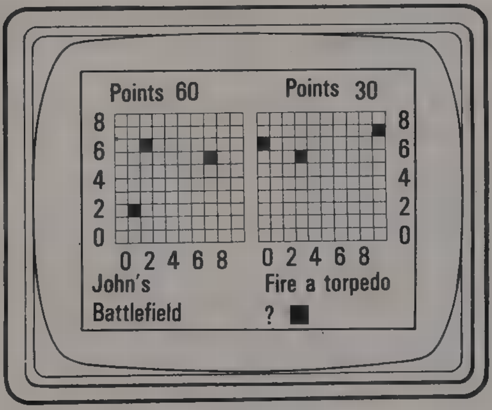
A game for two players.

PARENTS- a game to encourage and help early co-ordinate work and map reading skills.

CHILDREN- compete against your friends as you try to sink their destroyers and submarines, and blow up the mines that they have laid, by firing torpedoes at these targets!! A successful torpedo hit scores points, the value will depend on the target. The winner of the game is the first person to 150 points. At the start of the game, you will be asked your names. Type them in- remember to press the ENTER key after each name. Now, you need to mark the positions of your mines, submarines and destroyers on your computer grid (you could copy your grid onto paper as well if you wished). Enter the positions by using co-ordinates- enter the 'X' co-ordinate (horizontal) first, followed by the 'Y' co-ordinate (vertical). Press the ENTER key after each pair of co-ordinates. Make sure that your friend has his eyes closed, or better still, leaves the room while you do this!

Then it will be your friend's turn to enter his co-ordinates- you must leave the room as well! When all the co-ordinates have been entered, you have to guess the positions of your opponent's mines, submarines and destroyers. Alternately, type pairs of co-ordinates into the computer to see if you have guessed correctly.

Your screen will look like this:-



Remember, the first to reach a score of 150 points is the winner.

GOOD LUCK!!

PROGRAMMING HINT - RIGHT$

RIGHT$ is a function used to extract characters on the right of a given string expression.

Try this program:-

```
10 CLS

20 a$ = "Welcome"

30 PRINT RIGHT$(a$,3)

40 PRINT RIGHT$(a$,4)
```

Did you get "ome" and "come" on the screen? Line 30 of the program PRINTs the last three letters of the a$ "Welcome", and line 40 PRINTs the last four letters.

```
1 REM sea-battle
10 dr = 0 : dra = 0 : drb = 0 : drc = 0 : drd = 0
: dre = 0 : drf = 0 : drg = 0 : drh = 0
15 rd = 0 : rda = 0 : rdb = 0 : rdc = 0 : rdd = 0
: rde = 0 : rdf = 0 : rdg = 0 : rdh = 0
20 PEN 0 : INK 0,13 : PEN 1 : INK 1,7 : PEN 2 : IN
K 2,18 : PEN 3 : INK 3,24
30 WINDOW #1,1,20,1,13 : WINDOW #2,21,40,1,13 : WI
NDOW #3,1,20,14,25 : WINDOW #4,21,40,14,25
35 WINDOW #5,1,40,1,25
40 WINDOW #6,14,19,5,7 : WINDOW #7,21,26,1,3 : PAP
ER #6,0 : CLS #6 : PAPER #7,0 : CLS #7
100 BORDER 13 : PAPER #5,0 : CLS #5
105 GOSUB 500 : GOSUB 520
110 PEN #5,1 : LOCATE #5,1,14 : PRINT #5,"In this
game you have to sink each      others underwater
mines, submarines and destroyer. You will have to
place these on your opponent's grid but of course
  their positions will not be known."
115 PEN #5,3 : PRINT #5,"You will score points for
 each hit." : PEN #5,1 : PRINT #5,"The first to 15
0 points is the winner."
120 PRINT #5 : PEN #5,2 : PRINT #5,"Hit any key to
 continue"
```

```
125 a$ = INKEY$ : IF a$ = "" THEN 125
130 CLS #5 : GOSUB 500 : GOSUB 520 : pn = 0 : pm =
 0
135 PEN #3,2 : PRINT #3,"Player 1, what is   your
name?" : INPUT #3,na$
140 PRINT #3,na$ : PRINT #3,"You will use the    l
eft grid."
142 PEN #3,3 : PRINT #3,"MAKE SURE THAT YOUR OPPON
ENT IS NOT      LOOKING WHEN YOU    PLACE THE ARMAM
ENTS."
145 PEN #4,1 : PRINT #4,"Player 2, what is   your
name?" : INPUT #4,nam$
150 PRINT #4,nam$ : PRINT #4,"You will use the
right grid."
155 FOR t = 1 TO 3500 : NEXT t : CLS #3 : CLS #4
160 PEN #3,2 : PRINT #3,na$ : PRINT #3,"Where do y
ou want   the mines on your   opponent´s grid?" :
PRINT #3,"Horizontal          coordinate first" :
LOCATE #3,1,7 : INPUT #3,z : LOCATE #3,7,7 : INPUT
 #3,y
165 INPUT #3,x : LOCATE #3,7,8 : INPUT #3,w : INPU
T #3,v : LOCATE #3,7,9 : INPUT #3,u : INPUT #3,s :
 LOCATE #3,7,10 : INPUT #3,r
170 GOSUB 550 : CLS #3 : PRINT #3,"And now the
     submarines." : INPUT #3,p : LOCATE #3,7,3 : I
NPUT #3,q : INPUT #3,m : LOCATE #3,7,4 : INPUT #3,
n : INPUT #3,k : LOCATE #3,7,5 : INPUT #3,h : INPU
T #3,f : LOCATE #3,7,6 : INPUT #3,g
175 GOSUB 550 : CLS #3 : PRINT #3,"And finally the
     destroyer." : INPUT #3,d : LOCATE #3,7,3 : IN
PUT #3,e : GOSUB 550 : CLS #3
180 PEN #4,3 : PRINT #4,nam$ : PRINT #4,"Where do
you want   the mines on your   opponent´s grid?" :
 PRINT #4,"Horizontal          coordinate first" :
 LOCATE #4,1,7 : INPUT #4,zz : LOCATE #4,7,7 : INP
UT #4,yy
185 INPUT #4,xx : LOCATE #4,7,8 : INPUT #4,ww: INP
UT #4,vv : LOCATE #4,7,9 : INPUT #4,uu : INPUT #4,
ss : LOCATE #4,7,10 : INPUT #4,rr
190 GOSUB 550 : CLS #4 : PRINT #4,"And now the
     submarines." : INPUT #4,pp : LOCATE #4,7,3 :
INPUT #4,qq : INPUT #4,mm : LOCATE #4,7,4 : INPUT
#4,nn : INPUT #4,kk : LOCATE #4,7,5 : INPUT #4,hh
: INPUT #4,ff : LOCATE #4,7,6 : INPUT #4,gg
195 GOSUB 550 : CLS #4 : PRINT #4,"And finally the
     destroyer." : INPUT #4,dd : LOCATE #4,7,3 : I
NPUT #4,ee : GOSUB 550 : CLS #4
250 PEN #3,2 : PRINT #3,na$ : PRINT #3,"Battlefiel
d" : PRINT #3 : PRINT #3,"Fire a torpedo"
255 PRINT #3 : INPUT #3,an : LOCATE #3,7,6 : INPUT
```

```
 #3,ans
260 GOSUB 600 : GOSUB 550
265 CLS #6 : PEN #6,1 : PRINT #6,"Points" : PRINT
#6,pn
267 IF pn >= 150 THEN 450
270 CLS #3
300 PEN #4,1 : PRINT #4,nam$ : PRINT #4,"Battlefie
ld" : PRINT #4 : PRINT #4,"Fire a torpedo"
305 PRINT #4 : INPUT #4,an : LOCATE #4,7,6 : INPUT
 #4,ans
310 GOSUB 700 : GOSUB 550
315 CLS #7 : PEN #7,1 : PRINT #7,"Points" : PRINT
#7,pm
317 IF pm >= 150 THEN 470
320 CLS #4 : GOTO 250
420 PRINT #4,"Already hit" : RETURN
440 PRINT #3,"Already hit" : RETURN
450 CLS #3 : PRINT #3 : PRINT #3,na$ : PRINT #3,"W
ON" : GOTO 490
470 CLS #4 : PRINT #4 : PRINT #4,nam$ : PRINT #4,"
WON" : GOTO 490
490 FOR fm = 1 TO 10 : BORDER INT(RND*27) : GOSUB
570 : NEXT fm
495 END
500 REM l-grid
505 FOR a = 30 TO 190 STEP 16 : PLOT a,224,3 : DRA
W a,384,3 : NEXT a
510 FOR b = 224 TO 384 STEP 16 : PLOT 30,b,3 : DRA
W 190,b,3 : NEXT b
515 LOCATE #1,1,3 : PRINT #1,"8" : PRINT #1 : PRIN
T #1,"6" : PRINT #1 : PRINT #1,"4" : PRINT #1 : PR
INT #1,"2" : PRINT #1 : PRINT #1,"0" : PRINT #1,"
 0 2 4 6 8"
516 RETURN
520 FOR a = 417 TO 577 STEP 16 : PLOT a,224,3 : DR
AW a,384,3 : NEXT a
525 FOR b = 224 TO 384 STEP 16 : PLOT 417,b,3 : DR
AW 577,b,3 : NEXT b
527 LOCATE #2,18,3 : PRINT #2,"8" : LOCATE #2,18,5
 : PRINT #2,"6" : LOCATE #2,18,7 : PRINT #2,"4" :
LOCATE #2,18,9 : PRINT #2,"2" : LOCATE #2,18,11 :
PRINT #2,"0"  : LOCATE #2,5,12 : PRINT #2,"  0 2 4
 6 8"
530 RETURN
550 FOR t = 1 TO 3500 : NEXT t : RETURN
570 FOR wz = 1 TO 2 : SOUND 1,30,20,7 : FOR t = 1
TO 200 : NEXT t : NEXT wz : RETURN
580 FOR wy = 7 TO 3 STEP -1 : SOUND 2,2631,20,wy,0
,0,15 : FOR t = 1 TO 100 : NEXT t : NEXT wy : RETU
RN
```

```
600 PRINT #1,CHR$(22)+CHR$(1) : IF an = zz AND ans
 = yy AND dr = 1 THEN GOSUB 440 : GOTO 620
601 IF an = zz AND ans = yy THEN GOSUB 680 : dr =
1
602 IF an = xx AND ans = ww AND dra = 2 THEN GOSUB
 440 : GOTO 620
603 IF an = xx AND ans = ww THEN GOSUB 680 : dra =
 2
604 IF an = vv AND ans = uu AND drb = 3 THEN GOSUB
 440 : GOTO 620
605 IF an = vv AND ans = uu THEN GOSUB 680 : drb=
3
606 IF an = ss AND ans = rr AND drc = 4 THEN GOSUB
 440 : GOTO 620
607 IF an = ss AND ans = rr THEN GOSUB 680 : drc =
 4
608 IF an = pp AND ans = qq AND drd = 5 THEN GOSUB
 440 : GOTO 620
609 IF an = pp AND ans = qq THEN GOSUB 690 : drd =
 5
610 IF an = mm AND ans = nn AND dre = 6 THEN GOSUB
 440 : GOTO 620
611 IF an = mm AND ans = nn THEN GOSUB 690 : dre =
 6
612 IF an = kk AND ans = hh AND drf = 7 THEN GOSUB
 440 : GOTO 620
613 IF an = kk AND ans = hh THEN GOSUB 690 : drf =
 7
614 IF an = ff AND ans = gg AND drg = 8 THEN GOSUB
 440 : GOTO 620
615 IF an = ff AND ans = gg THEN GOSUB 690 : drg=
8
616 IF an = dd AND ans = ee AND drh = 9 THEN GOSUB
 440 : GOTO 620
617 IF an = dd AND ans = ee THEN GOSUB 695 : drh =
 9
618 PEN #1,1 : LOCATE #1,an+3,11-ans : PRINT #1,CH
R$(233) : GOSUB 570
620 RETURN
680 pn = pn + 10 : PRINT #3 : PRINT #3,"Mine hit!!
!!" : GOSUB 580 : RETURN
690 pn = pn + 20 : PRINT #3 : PRINT #3,"Submarine
hit!!" : GOSUB 580 : RETURN
695 pn = pn + 30 : PRINT #3 : PRINT #3,"Destroyer,
 great!!" : GOSUB 580 : RETURN
700 PRINT #2,CHR$(22)+CHR$(1) : IF an = z AND ans
= y AND rd = 1 THEN GOSUB 420 : GOTO 720
701 IF an = z AND ans = y THEN GOSUB 780 : rd = 1
702 IF an = x AND ans = w AND rda = 2 THEN GOSUB 4
20 : GOTO 720
```

```
703 IF an = x AND ans = w THEN GOSUB 780 : rda = 2

704 IF an = v AND ans = u AND rdb = 3 THEN GOSUB 4
20 : GOTO 720
705 IF an = v AND ans = u THEN GOSUB 780 : rdb = 3
706 IF an = s AND ans = r AND rdc = 4 THEN GOSUB 4
20 : GOTO 720
707 IF an = s AND ans = r THEN GOSUB 780 : rdc = 4

708 IF an = p AND ans = q AND rdd = 5 THEN GOSUB 4
20 : GOTO 720
709 IF an = p AND ans = q THEN GOSUB 790 : rdd = 5

710 IF an = m AND ans = n AND rde = 6 THEN GOSUB 4
20 : GOTO 720
711 IF an = m AND ans = n THEN GOSUB 790 : rde = 6

712 IF an = k AND ans = h AND rdf = 7 THEN GOSUB 4
20 : GOTO 720
713 IF an = k AND ans = h THEN GOSUB 790 : rdf = 7

714 IF an = f AND ans = g AND rdg = 8 THEN GOSUB 4
20 : GOTO 720
715 IF an = f AND ans = g THEN GOSUB 790 : rdg = 8

716 IF an = d AND ans = e AND rdh = 9 THEN GOSUB 4
20: GOTO 720
717 IF an = d AND ans = e THEN GOSUB 795 : rdh = 9

718 PEN #2,1 : LOCATE #2,an+7,11-ans : PRINT #2,CH
R$(233) : GOSUB 570
720 RETURN
780 pm = pm + 10 : PRINT #4 : PRINT #4,"Mine hit!!
!!" : GOSUB 580 : RETURN
790 pm = pm + 20 : PRINT #4 : PRINT #4,"Submarine
hit!!" : GOSUB 580 : RETURN
795 pm = pm + 30 : PRINT #4 : PRINT #4,"Destroyer,
 great!!" : GOSUB 580 : RETURN
```

GEOGRAPHY

BRITAIN- PHYSICAL **BRITAIN- TOWNS**

CAPITALS **E.E.C. QUIZ** **WORLD FACTS**

The following five programs include a wealth of geographical information which will help improve a student's knowledge of:-

a) The British Isles,

b) The European Economic Community,

c) Capital Cities,

and d) The geography of the physical world.

The two programs of the British Isles use maps on the screen, World Facts and the E.E.C. Quiz program refer to maps in the book, whilst Capital Cities is a board game for two players.

All these programs will require a certain amount of research and familiarity with maps and atlases, an area of educational learning that some students often find difficult, but which should be interesting.

A feature of these programs is that they can easily be adapted to test knowledge of other geographical areas of the world or individual countries.

BRITAIN-PHYSICAL

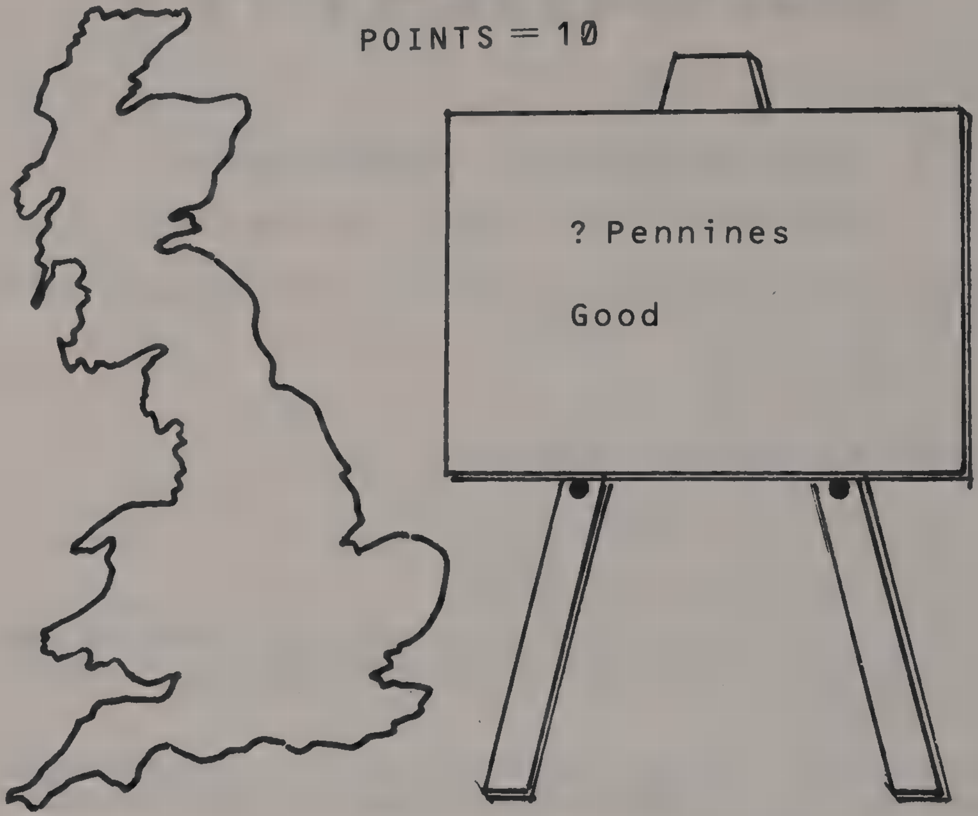
STUDENTS- this program uses a screen map of England, Wales and Scotland.

Do you know where the 'Pennines' are, or the 'Solent' is?

Now is the time to put your knowledge to the test! (But have an atlas handy as well!) Alongside the screen map, is a blackboard onto which you type your answer. You will be given ten features to identify from a selection of thirty. You must collect as many points as possible. There are no clues to help you, so you really must know your Britain! Remember to press the ENTER key after each answer.

You will be told your final score.

Your screen will look like this:-



```
1 REM britain-physical
5 DIM b(236) : DIM c(236) : DIM na$(30) : DIM p(17
) : DIM pr(17) : DIM r(17) : DIM rm(17) : DIM pp(1
7) : DIM pn(17) : DIM rr(17) : DIM rn(17)
7 DIM aa(31) : DIM ab(3) : DIM bc(3) : DIM be(31)
: DIM bf(31) : DIM fg(31) : DIM fb(31)
10 MODE 1
15 PEN 0 : INK 0,0 : PEN 1 : INK 1,26 : PEN 2 : IN
K 2,6 : PEN 3 : INK 3,2
16 BORDER 0 : PAPER 0
18 WINDOW #1,1,22,1,25 : WINDOW #2,23,40,1,25
19 WINDOW #3,22,40,3,14
20 RESTORE 500 : FOR a = 0 TO 235 : READ b(a) : RE
AD c(a) : NEXT a
22 RESTORE 700 : FOR ah = 0 TO 16 : READ na$(ah) :
 READ p(ah) : READ pr(ah) : READ r(ah) : READ rm(a
h) : READ pp(ah) : READ pn(ah) : READ rr(ah) : REA
D rn(ah) : NEXT ah
25 RESTORE 735 : READ na$(17) : FOR ah = 0 TO 15 :
 READ aa(ah) : NEXT ah
27 RESTORE 740 : READ na$(18) : FOR ah = 16 TO 31
: READ aa(ah) : NEXT ah
29 RESTORE 745 : FOR ah = 19 TO 22 : READ na$(ah)
: READ ab(ah-19) : READ bc(ah-19) : NEXT ah
31 RESTORE 750 : FOR ah = 23 TO 30 : READ na$(ah)
: READ be(ah) : READ bf(ah) : READ fg(ah) : READ f
b(ah) : NEXT ah
33 GOSUB 350 : LOCATE #3,4,4 : PRINT #3,"FACTS ABO
UT" : PRINT #3 : PRINT #3 : PRINT #3,"      BRITAIN
" : GOSUB 300 : FOR t = 1 TO 1000 : NEXT t
35 pt = 0
40 FOR bm = 1 TO 10
41 CLS #1 : CLS #2 : CLS #3 : GOSUB 350
45 s = INT(RND*31)
50 GOSUB 425
60 PEN #2,3 : LOCATE #2,1,1 : PRINT #2,"POINTS = "
;pt
70 IF s <= 10 THEN GOSUB 450
71 IF s >= 11 AND s <= 16 THEN GOSUB 490
72 IF s = 17 THEN GOSUB 460
74 IF s = 18 THEN GOSUB 465
76 IF s >= 19 AND s <= 22 THEN GOSUB 470
78 IF s >= 23 AND s <= 30 THEN GOSUB 480
125 PEN #3,2 : LOCATE #3,1,2 : PRINT #3 : PRINT #3
 : INPUT #3,ans$
130 IF ans$ = na$(s) THEN 200
135 PRINT #3 : PRINT #3,"No, answer is" : PRINT #3
,na$(s)
138 FOR t = 1 TO 3000 : NEXT t
150 CLS #3 : GOTO 230
200 LOCATE #3,1,8 : PRINT #3,"Good"
205 GOSUB 300
210 FOR t = 1 TO 1000 : NEXT t
217 pq = LEN(ans$)
218 pt = pt + pq
220 CLS #3
230 NEXT bm
250 CLS #3 : PEN #3,2 : LOCATE #3,1,4 : PRINT #3,"
Final Score" : PRINT #3 : PRINT #3,pt
260 PEN #3,3 : LOCATE #3,1,8 : PRINT #3,"Type run
for ten   more questions" : END
300 FOR tt = 1 TO 5 : SOUND 1,42,20,7 : FOR t = 1
TO 200 : NEXT t : NEXT tt : RETURN
350 PAPER #3,1 : CLS #3 : PLOT 375,0,1 : DRAW 395,
176,1 : DRAW 410,176 : DRAW 390,0 : DRAW 375,0
360 PLOT 610,0,1 : DRAW 590,176 : DRAW 575,176 : D
RAW 595,0 : DRAW 610,0
370 RETURN
425 PLOT b(0),c(0),1
```

```
430 FOR z = 1 TO 222 : DRAW b(z),c(z),1
432 NEXT z
440 PLOT b(223),c(223),1 : FOR y = 224 TO 228 : DR
AW b(y),c(y),1 : NEXT y
442 PLOT b(229),c(229),1 : FOR x = 230 TO 235 : DR
AW b(x),c(x),1 : NEXT x
445 RETURN
450 FOR e = 0 TO 4 : FOR f = 0 TO 4 : PLOT p(s)+e,
pr(s)+f,2 : PLOT r(s)+e,rm(s)+f : PLOT pp(s)+e,pn(
s)+f : PLOT rr(s)+e,rn(s)+f : NEXT f : NEXT e
452 RETURN
460 PLOT aa(0),aa(1),3 : FOR mt = 2 TO 9 STEP 2 :
DRAW aa(mt),aa(mt+1),3 : NEXT mt : PLOT aa(10),aa(
11),3 : DRAW aa(12),aa(13),3 : DRAW aa(14),aa(15)
: RETURN
465 PLOT aa(16),aa(17),3 : DRAW aa(18),aa(19),3 :
DRAW aa(20),aa(21) : DRAW aa(18),aa(19) : FOR mt =
 22 TO 31 STEP 2 : DRAW aa(mt),aa(mt+1),3 : NEXT m
t : RETURN
470 FOR e = 0 TO 4 : FOR f = 0 TO 4 :PLOT ab(s-19)
+e,bc(s-19)+f,2 : NEXT f : NEXT e : RETURN
480 FOR e = 0 TO 2 : FOR f = 0 TO 2 : PLOT be(s)+e
,bf(s)+f,2 : PLOT fg(s)+e,fb(s)+f,2 : NEXT f : NEX
T e : RETURN
490 PLOT p(s),pr(s),3 : DRAW r(s),rm(s),3 : DRAW p
p(s),pn(s) : DRAW rr(s),rn(s) : RETURN
500 DATA 100,8,100,12,110,18,120,30,130,40,133,50,
140,52,140,59,145,60,150,62,155,61,160,63,165,60,1
70,61,175,63,177,70,180,75,185,80,192,88,185,82,18
0,78,173,75,170,70,160,70,153,72,153,77,150,79,138
,76
510 DATA 138,80,137,84,132,82,128,84,120,76,115,75
,115,78,111,75,107,83,111,86,108,88,109,90,120,95,
130,103,142,112,142,120,140,128,130,125,123,123,14
0,143,145,145,148,148,150,146,160,149,169,145
520 DATA 165,150,165,154,174,148,175,150,167,155,1
66,160,173,169,167,168
530 DATA 167,177,172,180,170,180,170,182,172,185,1
72,190,168,186,167,188,163,183,161,190,150,200,155
,210,160,215,150,215,140,206,135,206,130,210,129,2
01,123,205,114,212
540 DATA 115,201,105,218,110,215,110,222,114,230,1
20,240,110,253,110,250,102,263,93,231,88,231,88,24
0,93,260,93,270,107,300,92,285,90,279,85,274,80,27
6,75,276,75,280
550 DATA 82,285,76,287,85,296,80,299,88,300,95,312
,86,307,86,311,80,309,73,318,75,321,70,320,70,323,
66,323,67,327,71,327,70,331,75,327,77,336,80,337,8
5,320,90,316
560 DATA 98,321,90,325,90,329,95,328,90,332,93,335
```

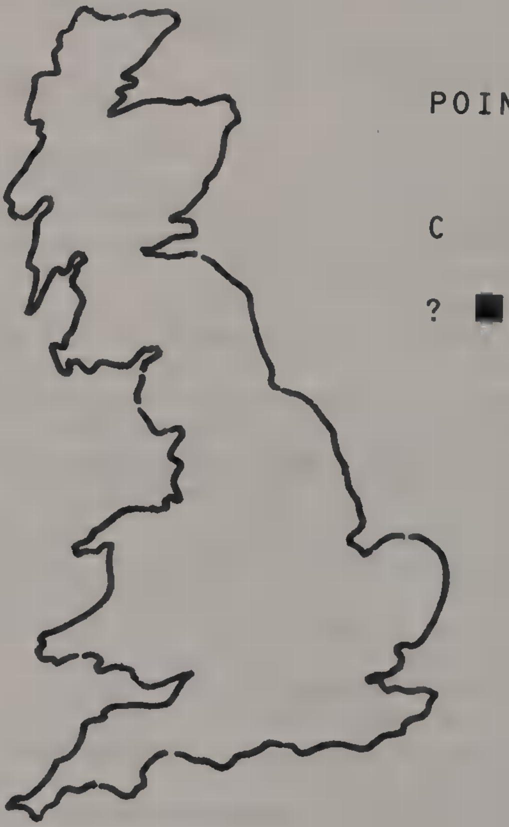
```
,92,343,96,340,96,345,100,344,106,346,101,354,105,
355,103,360
570 DATA 110,368,130,370,160,374,159,370,135,342,1
40,342,133,328,155,336,186,337,190,330,190,325,180
,304,173,290,165,286,157,282,165,284,172,278,160,2
70,151,265,145,266,155,261,170,265
580 DATA 180,263,215,205,220,208,235,197,237,200,2
44,193,242,188,252,172,240,176,228,174,240,173,258
,160,261,151,254,142
590 DATA 266,137,270,145,275,147,285,147,290,145,3
02,133,304,120,290,101,283,99,285,95,284,90,274,84
,258,82,268,80,282,84,281,80,302,84,299,78,301,74,
291,65,290,60,271,49,266,53,250,50,240,46,235,48,2
24,50,225,45,205,39
600 DATA 208,35,194,34,193,31,190,35,180,37,166,32
,158,20,135,26,128,22,128,24,122,17,118,15,117,12,
118,10,118,7,111,6,110,12,105,11,103,8,100,8
610 DATA 226,43,233,40,230,37,225,37,220,40,226,43
620 DATA 140,145,132,138,125,143,122,145,131,151,1
35,148,140,145
700 DATA Atlantic Ocean,10,340,40,320,30,290,50,26
0,North Sea,240,270,230,310,260,240,270,220,Irish
Sea,130,190,140,175,120,170,150,180
705 DATA English Channel,170,10,220,20,190,15,250,
30
715 DATA Brecon Beacons,170,82,165,85,157,90,150,9
4,Cambrian Mountains,150,105,153,113,155,120,158,1
32,Chiltern Hills,218,85,225,90,208,80,234,92,Cots
wold Hills,195,90,198,98,205,100,208,105,Pennines,
200,180,195,188,192,195,190,205
717 DATA Southern Uplands,160,245,153,238,145,235,
135,233,Grampian Highlands,140,305,150,312,160,320
,172,325
720 DATA River Tyne,177,220,177,224,203,226,183,22
5,River Mersey,175,149,185,147,188,148,185,144
725 DATA River Trent,192,145,203,140,220,148,230,1
74,River Towy,143,100,141,95,131,88,128,84,River C
lyde,139,234,132,245,125,244,120,240
730 DATA Great Ouse,234,110,248,112,258,124,265,13
7
735 DATA River Thames,200,79,218,74,228,79,236,75,
255,83,206,84,216,80,217,74
740 DATA River Severn,215,107,195,100,193,88,191,1
10,181,119,175,115,170,110,166,108
745 DATA The Wash,262,144,Solent,225,44,Isle of Wi
ght,225,38,Anglesey,131,145
750 DATA South Downs,250,60,285,65,North Downs,260
,75,290,75,The Weald,255,67,275,69,Exmoor,147,55,1
57,47,Dartmoor,145,33,150,28,Mendip Hills,182,67,1
```

```
87,70,Lake District,168,200,158,203,The Fens,263,1
33,255,137
```

BRITAIN-TOWNS

STUDENTS- this program also uses a screen map of England, Wales and Scotland. A town is marked in red on the map and you have to work out which town it is. You are given one clue: the first letter of the town. You will be given ten towns to identify, and you must collect as many points as you can- the number of points awarded depends on the number of letters in the name of the town. When you type in the town, remember to put the first letter as ■ capital letter, otherwise it will be incorrect. After ten towns, you will be given your final score.

Your screen will look like this:-



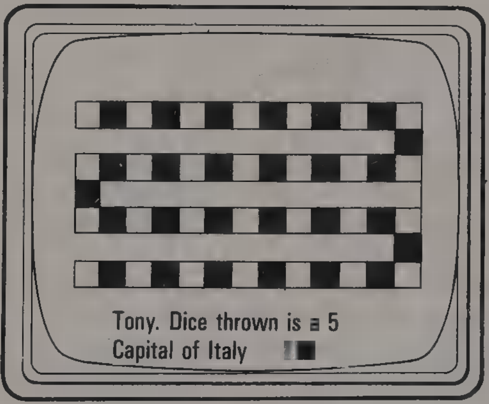
```
POINTS = 5

C

? ■
```

```
1 REM britain-towns
5 DIM b(236) : DIM c(236) : DIM na$(45) : DIM p(45
) : DIM r(45) : DIM ab$(45)
10 MODE 1
15 PEN 0 : INK 0,0 : PEN 1 : INK 1,26 : PEN 2 : IN
K 2,6 : PEN 3 : INK 3,24
16 BORDER 0 : PAPER 0
18 WINDOW #1,1,22,1,25 : WINDOW #2,23,40,1,25
20 RESTORE 500 : FOR a = 0 TO 235 : READ b(a) : RE
AD c(a) : NEXT a
30 RESTORE 700 : FOR k = 0 TO 45 : READ na$(k) : R
EAD p(k) : READ r(k) : READ ab$(k) : NEXT k
35 pt = 0
40 FOR bm = 1 TO 10
45 s = INT(RND*45)
50 GOSUB 425
60 PEN #2,3 : LOCATE #2,1,1 : PRINT #2,"POINTS = "
;pt
110 FOR e = 0 TO 4 : FOR f = 0 TO 4 : PLOT p(s)+e,
r(s)+f,2 : NEXT f : NEXT e
120 PEN #2,2 : LOCATE #2,2,8 : PRINT #2,ab$(s)
125 PRINT #2 : PRINT #2 : INPUT #2,ans$
130 IF ans$ = na$(s) THEN 200
135 PRINT #2 : PRINT #2,"No, answer is" : PRINT #2
,na$(s)
138 FOR t = 1 TO 3000 : NEXT t
140 GOSUB 300
150 CLS #2 : GOTO 230
200 LOCATE #2,1,20 : PRINT #2,"Good"
210 FOR t = 1 TO 3000 : NEXT t
215 GOSUB 300
217 pq = LEN(ans$)
218 pt = pt + pq
220 CLS #2
230 NEXT bm
250 CLS #2 : PEN #2,3 : LOCATE #2,1,8 : PRINT #2,"
Final Score" : PRINT #2 : PRINT #2,pt
260 PEN #2,3 : LOCATE #2,1,15 : PRINT #2,"Type run
 for ten  more questions" : END
300 FOR e = 0 TO 4 : FOR f = 0 TO 4 : PLOT p(s)+e,
r(s)+f,0 : NEXT f : NEXT e : RETURN
425 PLOT b(0),c(0),1
430 FOR z = 1 TO 222 : DRAW b(z),c(z),1
432 NEXT z
440 PLOT b(223),c(223),1 : FOR y = 224 TO 228 : DR
AW b(y),c(y),1 : NEXT y
442 PLOT b(229),c(229),1 : FOR x = 230 TO 235 : DR
AW b(x),c(x),1 : NEXT x
445 RETURN
500 DATA 100,8,100,12,110,18,120,30,130,40,133,50,
140,52,140,59,145,60,150,62,155,61,160,63,165,60,1
70,61,175,63,177,70,180,75,185,80,192,88,185,82,18
0,78,173,75,170,70,160,70,153,72,153,77,150,79,138
,76
510 DATA 138,80,137,84,132,82,128,84,120,76,115,75
,115,78,111,75,107,83,111,86,108,88,109,90,120,95,
130,103,142,112,142,120,140,128,130,125,123,123,14
0,143,145,145,148,148,150,146,160,149,169,145
520 DATA 165,150,165,154,174,148,175,150,167,155,1
66,160,173,169,167,168
530 DATA 167,177,172,180,170,180,170,182,172,185,1
72,190,168,186,167,188,163,183,161,190,150,200,155
,210,160,215,150,215,140,206,135,206,130,210,129,2
01,123,205,114,212
540 DATA 115,201,105,218,110,215,110,222,114,230,1
20,240,110,253,110,250,102,263,93,231,88,231,88,24
0,93,260,93,270,107,300,92,285,90,279,85,274,80,27
6,75,276,75,280
550 DATA 82,285,76,287,85,296,80,299,88,300,95,312
,86,307,86,311,80,309,73,318,75,321,70,320,70,323,
66,323,67,327,71,327,70,331,75,327,77,336,80,337,8
5,320,90,316
560 DATA 98,321,90,325,90,329,95,328,90,332,93,335
,92,343,96,340,96,345,100,344,106,346,101,354,105,
355,103,360
570 DATA 110,368,130,370,160,374,159,370,135,342,1
40,342,133,328,155,336,186,337,190,330,190,325,180
,304,173,290,165,286,157,282,165,284,172,278,160,2
70,151,265,145,266,155,261,170,265
580 DATA 180,263,215,205,220,208,235,197,237,200,2
44,193,242,188,252,172,240,176,228,174,240,173,258
,160,261,151,254,142
590 DATA 266,137,270,145,275,147,285,147,290,145,3
02,133,304,120,290,101,283,99,285,95,284,90,274,84
,258,82,268,80,282,84,281,80,302,84,299,78,301,74,
291,65,290,60,271,49,266,53,250,50,240,46,235,48,2
24,50,225,45,205,39
600 DATA 208,35,194,34,193,31,190,35,180,37,166,32
,158,20,135,26,128,22,128,24,122,17,118,15,117,12,
118,10,118,7,111,6,110,12,105,11,103,8,100,8
610 DATA 226,43,233,40,230,37,225,37,220,40,226,43
620 DATA 140,145,132,138,125,143,122,145,131,151,1
35,148,140,145
700 DATA Fort William,108,300,FW,Aberdeen,185,320,
A,Dundee,165,287,D,Edinburgh,157,258,E,Glasgow,130
,255,G,Aye,120,238,A,Carlisle,165,213,C,Newcastle,
195,225,N,Durham,200,212,D
710 DATA Middlesborough,217,207,M,York,208,185,Y,B
lackpool,166,172,B,Leeds,200,177,L,Hull,242,177,H,
Liverpool,168,154,L,Manchester,188,160,M,Sheffield
,205,157,S
720 DATA Lincoln,238,155,L,Bangor,142,143,B,Cheste
r,173,140,C,Nottingham,218,141,N,Derby,212,136,D,P
eterborough,248,126,P,Cambridge,258,113,C,Northamp
ton,227,112,N,Birmingham,194,130,B,Coventry,204,11
8,C,Worcester,190,110,W
730 DATA Aberystwyth,143,115,A,Hereford,183,102,H,
Gloucester,198,93,G,Oxford,225,90,O,London,253,83,
L,Swansea,150,80,S,Cardiff,175,77,C,Bristol,190,75
,B,Taunton,170,55,T,Exeter,163,36,E,Plymouth,140,2
6,P,Bournemouth,215,44,B,Southampton,225,52,S
740 DATA Portsmouth,230,50,P,Brighton,262,55,B,Nor
wich,288,135,N,Ipswich,285,106,I,Canterbury,290,77
,C
```

CAPITALS

A game for two players.

STUDENTS- this game will help to teach you the main capital cities of the world. On your screen, you will find a games board and the idea of the game is to travel along the pathways as quickly as you can.



```
Tony. Dice thrown is = 5
Capital of Italy
```

Before you can move, however, you must wait for a computer dice to be rolled to determine the number of places you may move if you get the right answer to a capital city question. If you give a wrong answer, you will be told the correct answer but, of course, you are not allowed to move. Try to remember this answer as it may arise again. The first person to 55 in the top left-hand corner is the winner.

```
1 REM capitals
10 y$ = CHR$(143)+CHR$(143)+CHR$(143)
15 DIM b$(46) : DIM c$(46) : DIM p(55) : DIM n(55)
 : DIM q(55) : DIM qq(55)
20 RESTORE 500 : FOR d = 1 TO 46 : READ b$(d) : RE
AD c$(d) : NEXT d
25 RESTORE 550 : FOR e = 1 TO 55 : READ p(e) : REA
D n(e) : READ q(e) : READ qq(e) : NEXT e
30 PEN 0 : INK 0,0 : PEN 1 : INK 1,18 : PEN 2 : IN
K 2,7 : PEN 3 : INK 3,26
40 WINDOW #1,1,40,1,25 : WINDOW #2,1,40,23,25
50 CLS #1 : PEN 3 : PRINT #1,"Player 1, what is yo
ur name" : INPUT #1,pl1$
55 PEN #1,3
60 PRINT #1 : PRINT #1,"Player 2, what is your nam
e" : INPUT #1,pl2$
70 GOSUB 380
90 pl1 = 1 : pl2 = 1
100 BORDER 0 : PAPER 0 : CLS
110 GOSUB 400
120 CLS #2 : PEN #2,2 : PRINT #2,pl1$; : GOSUB 390

130 h = INT(RND*46)+1 : PRINT #2,"Capital of ";b$(
h) : LOCATE #2,24,2 : INPUT #2,gh$
135 IF gh$ = c$(h) THEN 150
140 CLS #2 : PRINT #2,"No, answer is ";c$(h) : GOS
UB 380 : GOTO 200
150 LOCATE #1,p(pl1),n(pl1) : GOSUB 448 :  PRINT #
1,CHR$(143) : pl1 = pl1 + dic : GOSUB 485 : PEN #1
,2 : LOCATE #1,p(pl1),n(pl1) : PRINT #1,CHR$(251)

155 GOSUB 480
160 GOSUB 380 : CLS #2 : GOTO 200
200 CLS #2 : PEN #2,3 : PRINT #2,pl2$; : GOSUB 390

210 h = INT(RND*46)+1 : PRINT #2,"Capital of ";b$(
h) : LOCATE #2,24,2 : INPUT #2,gh$
215 IF gh$ = c$(h) THEN 230
220 CLS #2 : PRINT #2,"No, answer is ";c$(h) : GOS
UB 380 : GOTO 120
```

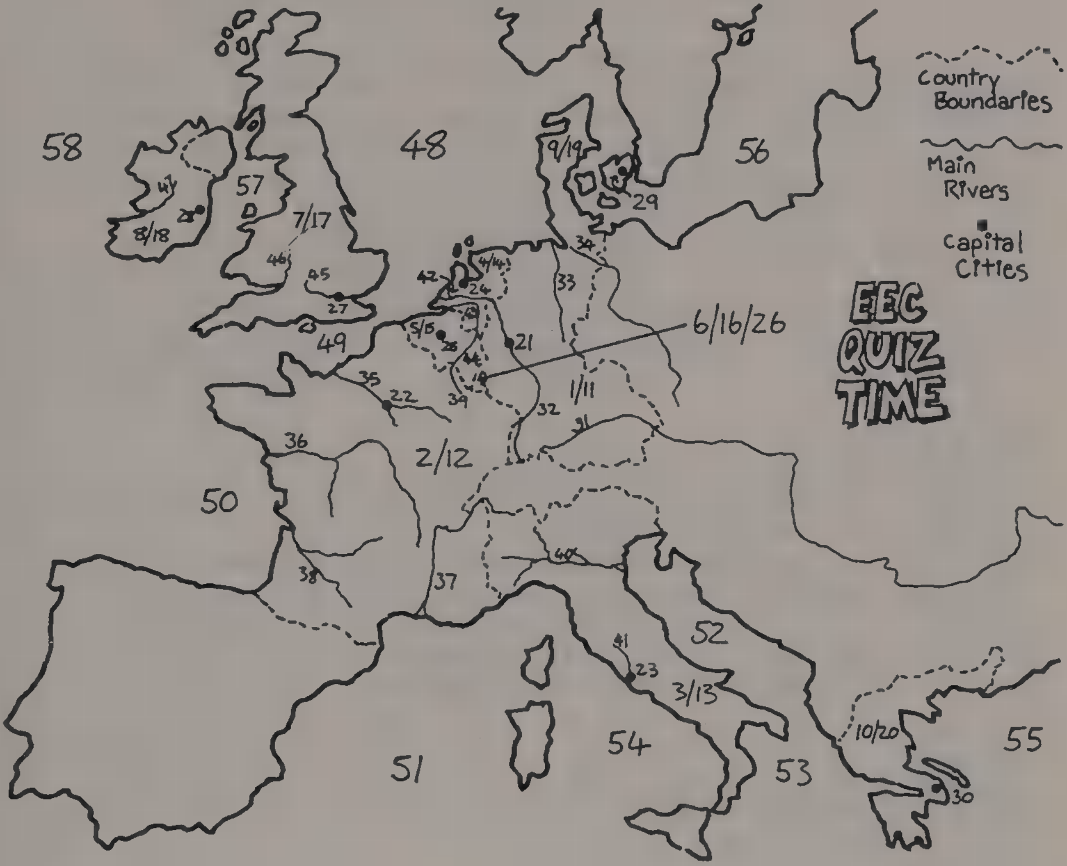
```
230 LOCATE #1,q(pl2),qq(pl2) : GOSUB 456 : PRINT #
1,CHR$(143) : pl2 = pl2 + dic : GOSUB 490 : PEN #1
,3 : LOCATE #1,q(pl2),qq(pl2) : PRINT #1,CHR$(231)

235 GOSUB 480
240 GOSUB 380 : CLS #2 : GOTO 120
380 FOR t = 1 TO 3000 : NEXT t : RETURN
390 dic = INT(RND*7) : PRINT #2," Dice thrown is a
 ";dic : RETURN
400 FOR a = 2 TO 38 STEP 6 : FOR b = 2 TO 20 STEP
6 : FOR c = 0 TO 2 : LOCATE #1,a,b+c : PEN #1,1 :
PRINT #1,y$ : NEXT c : NEXT b : NEXT a
410 FOR a = 5 TO 35 STEP 6 : FOR b = 2 TO 20 STEP
6 : FOR c = 0 TO 2 : LOCATE #1,a,b+c : PEN #1,2 :
PRINT #1,CHR$(143)CHR$(143)CHR$(143) : NEXT c : NE
XT b : NEXT a
425 FOR a = 0 TO 2 : FOR b = 0 TO 2 : PEN #1,2 : L
OCATE #1,38+a,5+b : PRINT #1,CHR$(143) : LOCATE #1
,38+a,17+b : PRINT #1,CHR$(143) : LOCATE #1,2+a,11
+b : PRINT #1,CHR$(143) : NEXT b : NEXT a
430 RETURN
448 pu = INT(pl1/2)*2
449 IF p(pl1) = 38 AND n(pl1) = 18 THEN PEN #1,1 :
 GOTO 455
450 IF p(pl1) = 2 AND n(pl1) = 12 THEN PEN #1,1 :
GOTO 455
451 IF p(pl1) = 38 AND n(pl1) = 6 THEN PEN #1,1 :
GOTO 455
453 IF pu = pl1 THEN PEN #1,2 ELSE PEN #1,1
455 RETURN
456 IF q(pl2) = 39 AND qq(pl2) = 18 THEN PEN #1,1
: GOTO 470
457 IF q(pl2) = 3 AND qq(pl2) = 12 THEN PEN #1,1 :
 GOTO 470
458 IF q(pl2) = 39 AND qq(pl2) = 6 THEN PEN #1,1 :
 GOTO 470
460 pu = INT(pl2/2)*2
465 IF pu = pl2 THEN PEN #1,2 ELSE PEN #1,1
470 RETURN
480 SOUND 1,3600,20,7 : FOR t = 1 TO 200 : NEXT t
: RETURN
485 IF pl1 >= 55 THEN CLS #2 : PRINT #2,pl1$;" you
 win" : END
487 RETURN
490 IF pl2 >= 55 THEN CLS #2 : PRINT #2,pl2$;" you
 win" : END
497 RETURN
500 DATA United Kingdom,London,India,New Delhi,Sri
 Lanka,Colombo,Kenya,Nairobi,Nigeria,Lagos,Zambia,
Lusaka,Canada,Ottawa,Bahamas,Nassau,Barbados,Bridg
```

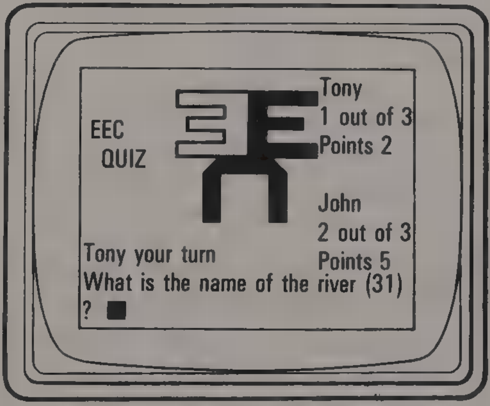
```
etown,Bermuda,Hamilton,Australia,Canberra,New Zeal
and,Wellington,Austria,Vienna
505 DATA Belgium,Brussels,Bulgaria,Sofia,Czechoslo
vakia,Prague,Denmark,Copenhagen,Finland,Helsinki,F
rance,Paris,West Germany,Bonn,East Germany,East Be
rlin,Greece,Athens,Hungary,Budapest
510 DATA Iceland,Reykjavik,Italy,Rome,Luxembourg,L
uxembourg,Monaco,Monaco,Netherlands,Amsterdam,Norw
ay,Oslo,Poland,Warsaw,Portugal,Lisbon,Romania,Buch
arest,Spain,Madrid
515 DATA Sweden,Stockholm,Switzerland,Berne,Russia
,Moscow,Yugoslavia,Belgrade,China,Peking,Israel,Je
rusalem,Japan,Tokyo,Egypt,Cairo,USA,Washington,Uru
guay,Montevideo,Peru,Lima,Colombia,Bogota,Argentin
a,Buenos Aires
550 DATA 2,21,3,21,5,21,6,21,8,21,9,21,11,21,12,21
,14,21,15,21,17,21,18,21,20,21,21,21,23,21,24,21,2
6,21,27,21,29,21,30,21,32,21,33,21,35,21,36,21,38,
21,39,21,38,18,39,18
555 DATA 38,15,39,15,35,15,36,15,32,15,33,15,29,15
,30,15,26,15,27,15,23,15,24,15,20,15,21,15,17,15,1
8,15,14,15,15,15,11,15,12,15,8,15,9,15,5,15,6,15,2
,15,3,15,2,12,3,12
560 DATA 2,9,3,9,5,9,6,9,8,9,9,9,11,9,12,9,14,9,15
,9,17,9,18,9,20,9,21,9,23,9,24,9,26,9,27,9,29,9,30
,9,32,9,33,9,35,9,36,9,38,9,39,9,38,6,39,6,38,3,39
,3
565 DATA 35,3,36,3,32,3,33,3,29,3,30,3,26,3,27,3,2
3,3,24,3,20,3,21,3,17,3,18,3,14,3,15,3,11,3,12,3,8
,3,9,3,5,3,6,3,2,3,3,3
```

E.E.C. QUIZ

A game for two players.

STUDENTS- this is a general program to test your knowledge of the E.E.C.(European Economic Community) ... their names and positions ... capital cities ... populations ... main rivers ... and the surrounding seas. The questions all refer to the numbered map of Europe. When you have typed in your answer, remember to press the ENTER key. You will each be asked ten questions and points will be awarded randomly for each correct answer. At the end of the game, the final points and the name of the winner will be displayed on the screen.





```
Tony
1 out of 3
Points 2

John
2 out of 3
Points 5
Tony your turn
What is the name of the river (31)
? ■
```

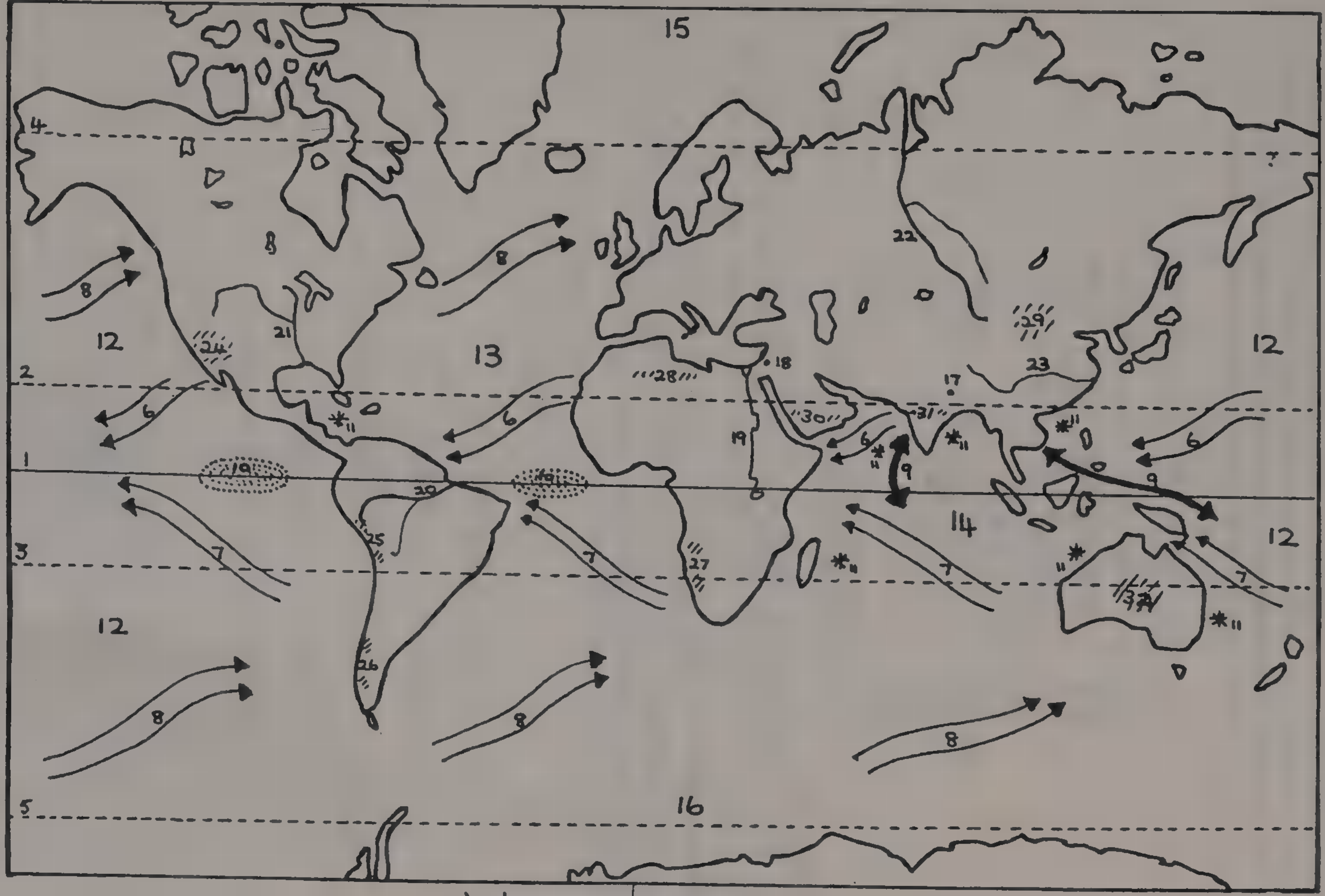
```
1 REM eec
8 DIM k$(58)
10 a$ = CHR$(143)+CHR$(143)+CHR$(143)+CHR$(143) :
b$ = CHR$(143)+CHR$(143)+CHR$(143)+CHR$(143)+CHR$(
143)
12 c$ = CHR$(214)+CHR$(143)+CHR$(212) : d$ = CHR$(
213)+CHR$(143)+CHR$(215)
20 PEN 0 : INK 0,26 : PEN 1 : INK 1,6 : PEN 2 : IN
K 2,1 : PEN 3 : INK 3,0
30 WINDOW #1,1,40,1,25 : WINDOW #2,1,11,1,16
35 WINDOW #3,12,27,1,16 : WINDOW #4,28,40,1,8
40 WINDOW #5,1,40,17,25 : WINDOW #6,28,40,9,16
50 FOR a = 1 TO 58 : READ k$(a) : NEXT a
60 PAPER #1,3 : CLS #1 : GOSUB 400
62 PAPER #2,3 : CLS #2 : LOCATE #2,2,5 : PEN #2,0
: PRINT #2,"E E C" : LOCATE #2,4,7 : PRINT #2,"Q U
 I Z"
65 PEN #5,1
70 PRINT #5,"Give me your names"
72 INPUT #5,"Player 1";na$
74 INPUT #5,"Player 2";nam$
80 PRINT #5,"Answer 10 questions each." : PRINT #5
,"Points will be randomly awarded for a   correct
answer."
85 PRINT #5,"Hit any key to start"
90 h$ = INKEY$ : IF h$ = "" THEN 90
110 cc = 0 : c = 0 : bb = 0 : b = 0 : pt1 = 0 : pt
2 = 0
120 GOSUB 380 : GOSUB 390
122 PAPER #5,3 : CLS #5
125 x = INT(RND*58)+1
130 PRINT #5,na$;" your turn"
135 GOSUB 350
140 PRINT #5 : INPUT #5,ans$
142 bb = bb + 1
145 IF ans$ = k$(x) THEN 150
147 PRINT #5,"No, answer is ";k$(x)
148 GOSUB 300 : GOSUB 380 : GOTO 170
150 PRINT #5,"Yes, well done. Bien. Oui." : y = IN
T(RND*5)+1 : pt1 = pt1 + y
152 cc =  cc + 1
155 GOSUB 380 : GOSUB 300
170 CLS #5
172 x = INT(RND*58)+1
175 PRINT #5,nam$;" your turn"
177 GOSUB 350
180 PRINT #5 : INPUT #5,ans$
185 b = b + 1
190 IF ans$ = k$(x) THEN 200
195 PRINT #5,"No, answer is ";k$(x)
```

```
197 GOSUB 300 : GOSUB 390 : GOTO 207
200 PRINT #5,"Yes, well done. Bien. Oui." : y = IN
T(RND*5)+1 : pt2 = pt2 + y
205 c = c + 1 : GOSUB 390 : GOSUB 300
207 IF b = 10 THEN 215
210 GOTO 122
215 CLS #5 : PRINT #5,"F I N A L   S C O R E S"
220 PRINT #5 : PRINT #5,na$;" = ";pt1
225 PRINT #5 : PRINT #5,nam$;" = ";pt2
230 IF pt1 = pt2 THEN PRINT #5,"SCORES EQUAL" : EN
D
232 IF pt1 < pt2 THEN PRINT #5,nam$;" YOU WON. WEL
L DONE." : END
234 PRINT #5,na$;" YOU WON. GREAT." : END
300 FOR t = 1 TO 3500 : NEXT t : RETURN
350 REM question
351 PRINT #5
352 IF x >= 1 AND x <= 10 THEN 360
354 IF x >= 11 AND x <= 20 THEN 363
356 IF x >= 21 AND x <= 30 THEN 366
358 IF x >= 31 AND x <= 47 THEN 369
359 IF x >= 48 AND x <= 58 THEN 372
360 PRINT #5,"Name the country (";x;")" : GOTO 375
363 PRINT #5,"What is the population, in
    millions (";x;")" : GOTO 375
366 PRINT #5,"Name the capital (";x;")" : GOTO 375

369 PRINT #5,"What is the name of the river (";x;"
)" : GOTO 375
372 PRINT #5,"Name this stretch of water (";x;")"
: GOTO 375
375 RETURN
380 REM player one
381 PAPER #4,3 : CLS #4
382 PRINT #4,na$ : PRINT #4 : PRINT #4,cc;"out of"
;bb
384 PRINT #4 : PRINT #4,"Points ";pt1
386 RETURN
390 REM player two
391 PAPER #6,3 : CLS #6
392 PRINT #6,nam$ : PRINT #6 : PRINT #6,c;"out of"
;b
394 PRINT #6 : PRINT #6,"Points ";pt2
396 RETURN
400 PAPER #3,3 : CLS #3 : LOCATE #3,3,2 : PEN #3,1
 : PRINT #3,b$ : LOCATE #3,4,6 : PRINT #3,a$ : LOC
ATE #3,3,10 : PRINT #3,b$
405 FOR m = 2 TO 10 : LOCATE #3,8,m : PEN #3,1 : P
RINT #3,CHR$(143) : LOCATE #3,9,m : PEN #3,0 : PRI
NT #3,CHR$(143) : NEXT m
```

```
410 PEN #3,0 : LOCATE #3,10,2 : PRINT #3,b$ : LOCA
TE #3,10,6 : PRINT #3,a$ : LOCATE #3,10,10 : PRINT
 #3,b$
415 PEN #3,2 : LOCATE #3,4,11 : PRINT #3,CHR$(214)
;a$;a$;CHR$(215) : LOCATE #3,3,12 : PRINT #3,c$ :
LOCATE #3,2,13 : PRINT #3,c$ : PRINT #3,CHR$(32);d
$ : LOCATE #3,3,15 : PRINT #3,d$ : LOCATE #3,4,16
: PRINT #3,CHR$(213)CHR$(212)
420 LOCATE #3,12,12 : PRINT #3,d$ : LOCATE #3,13,1
3 : PRINT #3,d$ : LOCATE #3,13,14 : PRINT #3,c$ :
LOCATE #3,12,15 : PRINT #3,c$ : LOCATE #3,12,16 :
PRINT #3,CHR$(213)CHR$(212)
425 RETURN
500 DATA West Germany,France,Italy,Netherlands,Bel
gium,Luxembourg,United Kingdom,Ireland,Denmark,Gre
ece
505 DATA sixty one,fifty three,fifty seven,fourtee
n,ten,one third,fifty six,three,five,nine
510 DATA Bonn,Paris,Rome,Amsterdam,Brussels,Luxemb
ourg,London,Dublin,Copenhagen,Athens
515 DATA Danube,Rhine,Weser,Elbe,Seine,Loire,Rhone
,Garonne,Meuse,Po,Tiber,Rhine,Maas,Maas,Thames,Sev
ern,Shannon
520 DATA North Sea,English Channel,Bay of Biscay,M
editerranean Sea,Adriatic Sea,Ionian Sea,Tyrrhenia
n Sea,Aegean Sea,Baltic Sea,Irish Sea,Atlantic Oce
an
```

WORLD FACTS

STUDENTS- do you know where the ‘Gobi Desert’ is, or the ‘Doldrums’ are, or where the ‘S.E.Trade Winds’ blow? In this program, there are 32 world geography facts that you should be familiar with, and you will be tested on any ten of these.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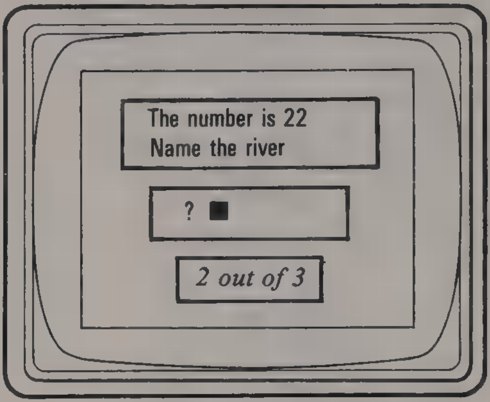
32

WORLD-FACTS

A number will appear on the screen relating to a position on the map. Locate the number and then type the name of the appropriate feature onto the screen. Remember to press the ENTER key. The program responds with music and a flashing screen of different colours for a correct answer. If you give a wrong answer, you will be corrected. Your current score will be displayed at the bottom of the screen which will look like this:-



```
The number is 22
Name the river

? ■

2 out of 3
```

TYPING TIP

Make sure that you type your DATA lines correctly, otherwise there will be some dramatic program changes! It is worth spending time to check each line of type.

PROGRAMMING HINT - < , < = , > , > =

What do all these relational operators mean? They appear between lines 80 and 135 in the 'World Facts' program. The symbols are usually used in an `IF....THEN` situation where lines are being compared. For instance:-

`IF m>=1` .....means IF `m` is greater than or equal to 1

`IF m>1` ......means IF `m` is greater than 1

`IF m<1` ......means IF `m` is less than 1

`IF m<=1` .....means IF `m` is less than or equal to 1

`IF m<>1` .....means IF `m` is not equal to 1.

Try to use these relational operators in your programs.

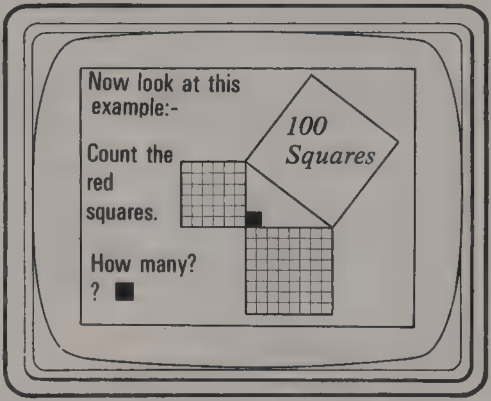
```
1 REM world-facts
10 DIM z$(32)
20 PEN 0 : INK 0,0 : PEN 1 : INK 1,26 : PEN 2 : IN
K 2,24 : PEN 3 : INK 3,5
25 WINDOW #1,1,40,1,25 : WINDOW #2,4,37,3,7 : WIND
OW #3,8,33,10,14 : WINDOW #4,14,27,18,22
30 FOR a = 1 TO 32 : READ z$(a) : NEXT a
40 BORDER 3 : PAPER #1,0 : PAPER #2,1 : PAPER #3,2
 : PAPER #4,3 : CLS #1 : CLS #2 : CLS #3 : CLS #4
45 c = 0 : g = 0
```

```
50 m = INT(RND*32)+1
55 IF g = 10 THEN 280
60 g = g + 1 : PEN #2,0
65 LOCATE #2,5,2 : PRINT #2,"The number is ";m
70 LOCATE #2,5,4 : PEN #2,0
80 IF m >= 1 AND m <= 5 THEN GOSUB 300
85 IF m >= 6 AND m <= 8 THEN GOSUB 310
90 IF m >= 9 AND m <= 11 THEN GOSUB 320
95 IF m >= 12 AND m <= 16 THEN GOSUB 330
100 IF m = 17 THEN GOSUB 340
105 IF m = 18 THEN GOSUB 350
110 IF m >= 19 AND m <= 23 THEN GOSUB 360
115 IF m >= 24 AND m <= 32 THEN GOSUB 370
130 PEN #3,0 : LOCATE #3.3.3 : INPUT #3.ans$
135 IF ans$ <> z$(m) THEN 200
140 FOR f = 1 TO 10 : BORDER INT(RND*27) : SOUND 1
,30,20,7 : FOR t = 1 TO 200 : NEXT t : NEXT f
145 c = c + 1
150 GOSUB 250
160 CLS #2 : CLS #3 : GOTO 50
200 PEN #2,3 : LOCATE #2,2,5 : PRINT #2,"Answer is
 ";z$(m) : FOR t = 1 TO 2000 :NEXT t
205 GOSUB 250
210 CLS #2 : CLS #3 : GOTO 50
250 CLS #4 : PEN #4,2 : LOCATE #4,1,3 : PRINT #4,c
;"out of";g : RETURN
280 CLS #2 : LOCATE #2,2,1 : PRINT #2,"  Type run
for ten more questions." : CLS #3 : LOCATE #3,2,3
: PRINT #3,"Your final score is"
285 LOCATE #2,3,4 : INPUT #2,h$
290 IF h$ = "run" THEN RUN ELSE END
300 PRINT #2,"What latitude is this?" : RETURN
310 PRINT #2,"Name these winds?" : RETURN
320 PRINT #2,"What kind of weather?" : RETURN
330 PRINT #2,"Name the ocean?" : RETURN
340 PRINT #2,"Highest point of the world?" : RETUR
N
350 PRINT #2,"Lowest point of the world?" : RETURN

360 PRINT #2,"Name the river?" : RETURN
370 PRINT #2,"Which desert is this?" : RETURN
500 DATA Equator,Tropic of Cancer,Tropic of Capric
orn,Arctic Circle,Antarctic Circle,North East Trad
es,South East Trades,Westerlies,Monsoons
505 DATA Doldrums,Typhoons or Hurricanes,Pacific,A
tlantic,Indian,Arctic,Southern,Mount Everest,Dead
Sea,Nile,Amazon
510 DATA Mississippi-Missouri,Irtysh,Yangtze,Great
 Western,Atacama,Patagonian,Kalahari,Sahara,Gobi,A
rabian,Thar,Australian
```

PYTHAGORAS

STUDENTS- are you bored with learning theorems? Well, try this program which explains through carefully graded questions, diagrams and answers, how Pythagoras is worked out. The program finishes with ten questions which will really test your knowledge and understanding. A calculator would be useful for this last exercise. After each keyboard entry, press ENTER .

There are many screen pictures, one of which will look like this:-



Now look at this example:-

Count the red squares.

How many?

? ■

PROGRAMMING HINT - `SQR`

The `SQR` function returns the square root of a numerical expression.

Hence,

```
PRINT SQR(64)
```

will give an answer of 8

Look at lines 202 and 203 in the program listing to see how it has been used.

```
1 REM pythagoras
30 PEN 0 : INK 0,0 : PEN 1 : INK 1,26 : PEN 2 : IN
K 2,7 : PEN 3 : INK 3,18
50 PAPER 1 : CLS : BORDER 25 : PEN 2
60 LOCATE 10,5 : PRINT "P Y T H A G O R A S" : GOS
UB 300
65 GOSUB 500 : GOSUB 320
70 CLS : GOSUB 300
75 PEN 0 : PRINT "The square on the hypoteneuse of
 a rightangled triangle is equal to the sum of  th
e squares on the other two sides."
80 GOSUB 330 : GOSUB 500 : PEN 0 : GOSUB 340
85 CLS : GOSUB 300 : PLOT 480,192,2 : DRAW 325,192
,2 : PLOT 340,200,2 : DRAW 320,192,2 : DRAW 340,18
4 : LOCATE 30,13 : PRINT "hypoteneuse" : GOSUB 330

90 LOCATE 1,1 : PRINT "If the sides measure 3, 4 a
nd 5 units   where 5 is the hypoteneuse then this
is true." : GOSUB 350
95 GOSUB 330
100 PEN 2 : LOCATE 15,14 : PRINT "3" : GOSUB 350 :
 LOCATE 20,18 : PRINT "4" : GOSUB 350 : LOCATE 20,
12 : PRINT "5" : GOSUB 350
110 PEN 3 : LOCATE 2,20 : PRINT "3 squared + 4 squ
ared = 5 squared"
120 PRINT : PRINT "  ( 3 X 3 ) + ( 4 X 4 ) = ( 5 X
 5 )" : GOSUB 320
130 PEN 0 : PRINT : PRINT "Therefore     9  +  16
 =  25" : GOSUB 340
140 CLS : PEN 0 : PRINT "Now look at this example
:-" : GOSUB 300 : GOSUB 500 : GOSUB 400 : GOSUB 42
0
150 LOCATE 22,8 : PRINT "100" : LOCATE 20,10 : PRI
NT "squares"
160 LOCATE 1,11 : PRINT "Count the" : PRINT "red"
: PRINT "squares." : PRINT "How many?" : INPUT re
170 LOCATE 1,19 : PRINT "Now count the" : PRINT "g
reen squares" : PRINT "How many?" : INPUT gr
180 LOCATE 1,23 : PEN 2 : PRINT "Do the green" : P
RINT "and red squares" : PRINT "make 100" : LOCATE
 17,25 : INPUT ans$
190 IF ans$ = "no" THEN LOCATE 30,25 : PRINT "try
again" : GOSUB 330 : GOTO 140
195 LOCATE 30,25 : PRINT "good" : GOSUB 330
197 FOR nu = 1 TO 10
200 CLS  : PRINT "Now let's try ten problems. You
will    find a calculator useful." : GOSUB 300 : L
OCATE 15,14 : PRINT "a" : LOCATE 20,18 : PRINT "c"
 : LOCATE 20,12 : PRINT "b"
```

```
202 m = INT(RND*15)+5 : n = INT(RND*15)+5
203 p = SQR((m*m)+(n*n))
205 LOCATE 3,12 : PRINT "a = ";m
208 LOCATE 3,14 : PRINT "c = ";n
210 LOCATE 3,16 : PRINT "What is b" : LOCATE 3,18
 : INPUT ans
212 PRINT : PRINT
215 PRINT "The answer to two decimal points should
 be "ROUND(p,2)
220 PRINT "I hope you managed that." : GOSUB 330
225 NEXT nu
230 END
300 PLOT 256,240,3 : DRAW 384,144,3 : DRAW 256,144
 : DRAW 256,240
302 PEN 0 : LOCATE 17,16 : PRINT CHR$(143) : LOCAT
E 1,1
305 RETURN
320 FOR b = 1 TO 8 : SOUND 1,3450,20,7 : SOUND 2,1
60,20,7 : FOR t = 1 TO 200 : NEXT t : NEXT b : RET
URN
330 FOR t = 1 TO 4000 : NEXT t : RETURN
340 LOCATE 3,25 : PRINT "Hit any key to continue"
342 a$ = INKEY$ : IF a$ = "" THEN 342
344 RETURN
350 SOUND 1,30,20,7 : FOR t = 1 TO 1000 : NEXT t :
 RETURN
400 FOR a = 256 TO 384 STEP 16 : PLOT a,16,0 : DRA
W a,143,0 : NEXT a : FOR a = 16 TO 144 STEP 16 : P
LOT 256,a : DRAW 384,a : NEXT a
410 RETURN
420 FOR a = 144 TO 240 STEP 16 : PLOT 160,a,0 : DR
AW 256,a,0  : NEXT a : FOR a = 160 TO 256 STEP 16
: PLOT a,144,0 : DRAW a,240,0 : NEXT a : RETURN
500 FOR a = 256 TO 384 : PLOT a,16 : DRAW a,143 :
NEXT a
505 FOR a = 144 TO 240 : PLOT 160,a,2 : DRAW 255,a
,2 : NEXT a
510 PLOT 256,240,0 : DRAW 372,355,0 : DRAW 496,256
 : DRAW 384,144
515 RETURN
```

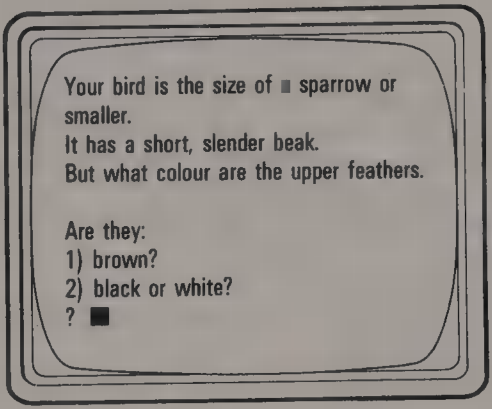
NAME THAT BIRD

GARDEN-BIRDS and BIRDFACTS

These two programs will help you identify the birds that visit your garden. BIRDFACTS is a fact file and a good reference guide for fifteen common garden birds, the other, GARDEN-BIRDS allows the computer to identify the bird that you are describing through questions and answers.

GARDEN-BIRDS-is a program that will help you identify twenty three of the more common garden birds. The idea is that by using ■ good bird book or by trying to remember your facts from memory you select ■ garden bird of your choice and then by answering the computer's questions, the computer will try to identify the bird that you are describing. If the computer does not recognise the bird you will be informed.

Be accurate with your descriptions. Your screen may look like this:-



```
Your bird is the size of ■ sparrow or
smaller.
It has a short, slender beak.
But what colour are the upper feathers.

Are they:
1) brown?
2) black or white?
? ■
```

```
1 REM garden-birds
5 w$ = "Your bird is larger than a sparrow." : bb$
 = "Your bird is the size of a sparrow or    smalle
r." : cc$ = "It has a short, stumpy beak."
6 dd$ = "The computer thinks that it is a" : ee$ =
 "It has a short, slender beak." : ff$ = "It has a
 short, sharp beak."
7 gg$ = "It has a stout beak."
10 PEN 0 : INK 0,0 : PEN 1 : INK 1,26 : PEN 2 : IN
K 2,6 : PEN 3 : INK 3,24
15 BORDER 0 : PAPER 0
20 PEN 3 : CLS : FOR g = 0 TO 27 : LOCATE 7+g,3 :
PRINT"*" : LOCATE 7+g,11 : PRINT "*" : NEXT g
25 FOR g = 0 TO 6 : LOCATE 7,4+g : PRINT "*" : LOC
ATE 34,4+g : PRINT "*" : NEXT g
30 PEN 2 : LOCATE 12,5 : PRINT "S P O T    T H A T
" : LOCATE 16,7 : PRINT "G A R D E N" : LOCATE 17,
9 : PRINT "B I R D"
45 FOR t = 1 TO 3000 : NEXT t
50 PEN 1 : CLS : PRINT "What is the size of the bi
rd?" : PRINT : PRINT "Is it :" : PRINT : PRINT "1)
 The size of a sparrow or smaller?"
55 PRINT : PRINT "2) Larger than a sparrow?" : PRI
NT : PRINT "Press 1 or 2"
60 INPUT b$
65 IF b$ = "1" THEN 100
70 IF b$ = "2" THEN 600
75 PRINT : PRINT "1 or 2 only" : GOSUB 1000 : GOTO
 50
100 CLS : PEN 2 : PRINT bb$ : PRINT : PRINT "What
type of beak has it got?" : PRINT : PRINT "Is it :
" : PRINT : PRINT "1) short and stumpy?"
105 PRINT : PRINT "2) short and slender?" : PRINT
: PRINT "3) short and sharp?"
107 PRINT : PRINT "Press 1,2 or 3"
110 PRINT : INPUT c$
115 IF c$ = "1" THEN 150
120 IF c$ = "2" THEN 300
125 IF c$ = "3" THEN 450
130 PRINT : PRINT "1,2 or 3 only" : GOSUB 1000 : G
OTO 100
150 CLS : PEN 3 : PRINT bb$ : PRINT cc$ : PEN 1 :
PRINT : PRINT : PRINT "But what colourings has it?
" : PRINT : PRINT "Is it :"
155 PRINT : PRINT "1) olive green?" : PRINT : PRIN
T "2) brown streaked with black?" : PRINT : PRINT
"3) red or orange on the head or breast?"
160 PRINT : PRINT "Press 1,2 or 3"
165 PRINT : INPUT d$
170 IF d$ = "1" THEN 200
```

```
175 IF d$ = "2" THEN 220
180 IF d$ = "3" THEN 240
185 PRINT : PRINT "Press 1,2 or 3" : GOSUB 1000 :
GOTO 150
200 CLS : PEN 2 : PRINT bb$ : PRINT cc$ : PRINT "I
t is olive green." : PRINT : PRINT dd$ : PRINT : P
RINT "GREENFINCH"
210 GOTO 1100
220 CLS : PEN 2 : PRINT bb$ : PRINT cc$ : PRINT "I
t has brown colourings streaked with black." : PRI
NT : PRINT dd$ : PRINT : PRINT "HOUSE SPARROW" : G
OTO 1100
240 CLS : PEN 2 : PRINT bb$ : PRINT cc$ : PRINT "I
t has red or orange markings on the head or   brea
st."
245 PEN 1 : PRINT : PRINT "I need some more distin
guishing marks." : PRINT : PRINT "Has it also got
a broad band of yellow  on the wing?"
250 INPUT e$
255 IF e$ = "yes" OR e$ = "YES" THEN 280
260 PRINT : PRINT "Has it got :" : PRINT : PRINT "
1) a pink chest with a blue/grey crown?" : PRINT :
 PRINT "2) a rose pink chest with a black cap?" :
PRINT : PRINT "3) none of these"
265 PRINT : PRINT "Press 1,2 or 3"
268 INPUT f$
269 IF f$ = "1" THEN 275
270 IF f$ = "2" THEN 277
271 IF f$ = "3" THEN 279
275 PRINT : PRINT dd$ : PRINT : PRINT "CHAFFINCH"
:  GOTO 1100
277 PRINT : PRINT dd$ : PRINT : PRINT "BULLFINCH"
: GOTO 1100
279 GOTO 1130
280 PRINT : PRINT dd$ : PRINT : PRINT "GOLDFINCH"
: GOTO 1100
300 CLS : PEN 3 : PRINT bb$ : PRINT ee$ : PRINT :
PEN 2 : PRINT "But what colour are the upper body
     feathers?"
305 PRINT : PRINT "Are they : " : PRINT : PRINT "1
) brown?" : PRINT : PRINT "2) black and white?"
310 INPUT g$
315 IF g$ = "1" THEN 350
320 IF g$ = "2" THEN 325
322 PRINT "Press 1 or 2" : GOSUB 1000 : GOTO 300
325 CLS : PEN 3 : PRINT bb$ : PRINT ee$ : PRINT "I
t has black and white feathers." : PRINT : PRINT d
d$ : PRINT : PRINT "PIED WAGTAIL" : GOTO 1100
350 CLS : PEN 3 : PRINT bb$ : PRINT ee$ : PRINT "I
t has brown upper feathers."
```

```
355 PRINT : PRINT "But what is the colour of it´s
breast?" : PRINT : PRINT "1) grey" : PRINT : PRINT
 "2) red"
360 PRINT : PRINT "Press 1 or 2"
365 INPUT h$
368 IF h$ = "1" THEN 380
369 IF h$ = "2" THEN 372
370 PRINT : PRINT "Press 1 or 2" : GOSUB 1000 : GO
TO 350
372 CLS : PEN 3 : PRINT bb$ : PRINT ee$ : PRINT "I
t has brown upper feathers and a red chest."
375 PRINT : PRINT dd$ : PRINT : PRINT "ROBIN" : GO
TO 1100
380 CLS : PEN 3 : PRINT bb$ : PRINT ee$ : PRINT "I
t has brown upper feathers and a grey breast."
385 PRINT : PRINT "I need some mor distinguishing
marks." : PRINT : PRINT "Is it very small with a s
mall tail that is often cocked up?"
387 INPUT j$
389 IF j$ = "yes" OR j$ = "YES" THEN 400
395 CLS : PEN 3 : PRINT bb$ : PRINT ee$ : PRINT "I
t has brown upper feathers and a slate/grey   brea
st." : PRINT : PRINT dd$ : PRINT "DUNNOCK often co
nfused with a house      sparrow."
396 GOTO 1100
400 CLS : PEN 3 : PRINT bb$ : PRINT ee$ : PRINT "I
t has brown upper feathers and a red breast." : PR
INT : PRINT dd$ : PRINT : PRINT "ROBIN" : GOTO 110
0
450 CLS : PEN 3 : PRINT bb$ : PRINT ff$ : PEN 1 :
PRINT : PRINT "But what colourings has it?" : PRIN
T : PRINT "Is it :"
455 PRINT : PRINT "1) grey" : PRINT : PRINT "2) ye
llow" : PRINT : PRINT "3) black and white" : PRINT
 : PRINT "4) black" : PRINT : PRINT "5) red or ora
nge on the head or breast"
460 PRINT : PRINT "Press 1, 2, 3, 4 or 5"
465 PRINT : INPUT m$
470 IF m$ = "1" THEN 480
471 IF m$ = "2" THEN 510
472 IF m$ = "3" THEN 540
473 IF m$ = "4" THEN 550
474 IF m$ = "5" THEN 560
475 PRINT : PRINT "Press 1, 2, 3, 4 or 5" : GOSUB
1000 : GOTO 450
480 CLS : PEN 2 : PRINT bb$ : PRINT ff$ : PRINT "I
t has grey feathers."
485 PEN 1 : PRINT : PRINT "I need some more distin
guishing marks." : PRINT : PRINT "Has it got a cur
ved beak?"
```

```
490 PRINT : INPUT n$
492 IF n$ = "yes" OR n$ = "YES" THEN 500
495 PRINT : PRINT dd$ : PRINT : PRINT "COAL TIT" :
 GOTO 1100
500 PRINT : PRINT dd$ : PRINT : PRINT "TREE CREEPE
R" : GOTO 1100
510 CLS : PEN 2 : PRINT bb$ : PRINT ff$ : PRINT "I
t has yellow feathers."
515 PEN 1 : PRINT : PRINT "I need some more distin
guishing marks." : PRINT : PRINT "Has it got blue
shades on it's wings,   tail and head?" : PRINT
520 INPUT p$
521 IF p$ = "yes" OR p$ = "YES" THEN 530
525 PRINT : PRINT dd$ : PRINT : PRINT "GREAT TIT"
: GOTO 1100
530 PRINT : PRINT dd$ : PRINT : PRINT "BLUE TIT" :
 GOTO 1100
540 CLS : PEN 2 : PRINT bb$ : PRINT ff$ : PRINT "I
t has black and white feathers"
545 PRINT : PRINT dd$ : PRINT : PRINT "HOUSE MARTI
N" : GOTO 1100
550 CLS : PEN 2 : PRINT bb$ : PRINT ff$ : PRINT "I
t has black feathers"
555 PRINT : PRINT dd$ : PRINT : PRINT "SWIFT" : GO
TO 1100
560 CLS : PEN 2 : PRINT bb$ : PRINT ff$ : PRINT "I
t has red or orange on the head or breast"
565 PEN 1 : PRINT : PRINT "I need some more distin
guishing marks." : PRINT : PRINT "Has it got a whi
te throat and slate-grey upper feathers?"
570 PRINT : INPUT q$
572 IF q$ = "yes" OR q$ = "YES" THEN 580
575 PRINT : PRINT dd$ : PRINT : PRINT "SWALLOW" :
GOTO 1100
580 PRINT : PRINT dd$ : PRINT : PRINT "NUTHATCH" :
 GOTO 1100
600 CLS : PEN 2 : PRINT w$ : PRINT : PEN 1 : PRINT
 "What type of beak has it got?"
605 PRINT : PRINT "Is it :" : PRINT : PRINT "1) sh
ort and slender" : PRINT : PRINT "2) stout"
607 PRINT : PRINT "Press 1 or 2"
610 PRINT : INPUT r$
612 IF r$ = "1" THEN 750
614 IF r$ = "2" THEN 650
616 PRINT : PRINT "Press 1 or 2 only" : GOSUB 1000
 : GOTO 600
650 CLS : PEN 2 : PRINT w$ : PRINT gg$ : PEN 1 : P
RINT : PRINT "But what are it's colourings?" : PRI
NT : PRINT "Is it :"
```

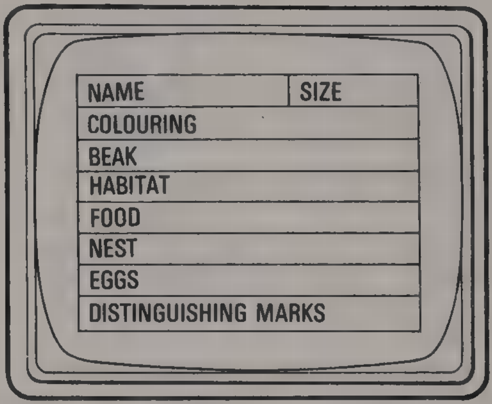
```
655 PRINT : PRINT "1) grey?" : PRINT : PRINT "2) g
rey and brown?" : PRINT : PRINT "3) brown with blu
e on the wing?" : PRINT : PRINT "4) black and whit
e?"
657 PRINT : PRINT "Press 1, 2, 3 or 4"
660 INPUT x$
662 IF x$ = "1" THEN 680
664 IF x$ = "2" THEN 690
666 IF x$ = "3" THEN 700
668 IF x$ = "4" THEN 710
670 PRINT : PRINT "Press 1, 2, 3 or 4 only" : GOSU
B 1000 : GOTO 650
680 CLS : PEN 2 : PRINT w$ : PRINT gg$ : PRINT "It
 has grey feathers." : PRINT : PRINT dd$ : PRINT :
 PRINT"WOOD-PIGEON" : GOTO 1100
690 CLS : PEN 2 : PRINT w$ : PRINT gg$ : PRINT "It
 has grey-brown feathers." : PRINT : PRINT dd$ : P
RINT : PRINT"COLLARED DOVE" : GOTO 1100
700 CLS : PEN 2 : PRINT w$ : PRINT gg$ : PRINT "It
 has brown feathers with blue on the  wing." : PRI
NT : PRINT dd$ : PRINT : PRINT "JAY" : GOTO 1100
710 CLS : PEN 2 : PRINT w$ : PRINT gg$ : PRINT "It
 has black and white feathers." : PRINT : PRINT dd
$ : PRINT : PRINT "MAGPIE" : GOTO 1100
750 CLS : PEN 2 : PRINT w$ : PRINT ee$ : PEN 1 : P
RINT : PRINT "But what are it's colourings?"  : PR
INT "What is the colour of it's crown?" : PRINT :
PRINT "1) black" : PRINT : PRINT "2) brown"
755 PRINT : PRINT "Press 1 or 2" : PRINT : INPUT y
$
760 IF y$ = "1" THEN 780
765 IF y$ = "2" THEN 850
770 PRINT : PRINT "Press 1 or 2 only" : GOSUB 1000
 : GOTO 750
780 CLS : PEN 2 : PRINT w$ : PRINT ee$ : PRINT "Wi
th black feathers." : PEN 1 : PRINT : PRINT "I nee
d some more distinguishing marks"
785 PRINT : PRINT "Is it's breast black?" : PRINT
: INPUT zz$
790 IF zz$ = "yes" OR zz$ = "YES" THEN 810
795 CLS : PEN 2 : PRINT w$ : PRINT ee$ : PRINT "Wi
th black feathers." : PEN 1 : PRINT : PRINT "Has i
t got a speckled green, blue and   purple plumage?
" : PRINT : INPUT xx$
800 IF xx$ = "yes" OR xx$ = "YES" THEN 805
802 GOTO 1130
805 PRINT dd$ : PRINT : PRINT "STARLING" : GOTO 11
00
810 CLS : PEN 2 : PRINT w$ : PRINT ee$ : PRINT "Wi
th black feathers." : PRINT "It has a black breast
```

```
." : PRINT : PRINT dd$ : PRINT : PRINT "BLACKBIRD"
 : GOTO 1100
850 CLS : PEN 2 : PRINT w$ : PRINT ee$ : PRINT "Wi
th brown feathers." : PEN 1 : PRINT : PRINT "I nee
d some more distinguishing marks"
855 PRINT : PRINT "Has it a speckled breast with r
ed         patches under it´s wing and on it´s      f
lank?" : PRINT : INPUT yy$
860 IF yy$ = "yes" OR yy$ = "YES" THEN 900
865 CLS : PEN 2 : PRINT w$ : PRINT ee$ : PRINT "Wi
th brown feathers." : PEN 1 : PRINT : PRINT "Has i
t got a speckled breast with" : PRINT : PRINT "1)
bold spots?" : PRINT : PRINT "2) small spots?"
870 PRINT : PRINT "3) no speckles at all?" : PRINT
 : INPUT ww$
875 IF ww$ = "1" THEN 890
880 IF ww$ = "2" THEN 895
881 IF ww$ = "3" THEN 898
882 PRINT "Press 1, 2 or 3 only"
890 CLS : PEN 2 : PRINT w$ : PRINT ee$ : PRINT "Wi
th brown feathers." : PRINT "It has got a speckled
 breast with bold  spots." : PRINT : PRINT dd$ : P
RINT : PRINT "MISTLE THRUSH" : GOTO 1100
895 CLS : PEN 2 : PRINT w$ : PRINT ee$ : PRINT "Wi
th brown feathers." : PRINT "It has got a speckled
 breast with small spots." : PRINT : PRINT dd$ : P
RINT : PRINT "SONG THRUSH" : GOTO 1100
898 GOTO 1130
900 CLS : PEN 2 : PRINT w$ : PRINT ee$ : PRINT "Wi
th brown feathers." : PRINT "It has a speckled che
st and red patches on it´s wing and flank." : PRIN
T : PRINT dd$ : PRINT : PRINT "REDWING"
905 GOTO 1100
1000 FOR t = 1 TO 3000 : NEXT t : RETURN
1100 PRINT : PRINT "Am I correct?"
1110 PRINT : INPUT ans$
1120 IF ans$ = "yes" OR ans$ = " YES" THEN PRINT "
Great we are both bright!!" : END
1130 PRINT "Your bird is not in my book." : PRINT
"Try another one." : END
```

BIRDFACTS- is a fact file program written in mode 2, so enabling more information to be shown on the screen. The program lists the birds for which there is information and asks you to enter the one that you require information on. The clear well laid out screen presents you with the facts under the headings :-

name
size
colouring
beak
habitat
food
nest
eggs
distinguishing marks

Your screen will look like this:-



NAME	SIZE
COLOURING	
BEAK	
HABITAT	
FOOD	
NEST	
EGGS	
DISTINGUISHING MARKS	

TYPING TIP

Both programs are long but well worth persevering with. Check each line as it is completed, thus avoiding possible problems later.

PROGRAMMING HINT - MERGE

You may have noticed that the listing for GARDEN-BIRDS ended with line 1130 and that the listing for BIRDFACTS begins at line 1400. This gives the opportunity to `MERGE` the two programs together as the line numbers will not overlap. `LOAD"GARDEN-BIRDS"` and then without switching off the computer load `BIRDFACTS` using the command `MERGE(BIRDFACTS)`. You will now have both programs in your computer's memory but because `GARDEN-BIRDS` begins with line 1 the instructions for the other program are never reached. Try writing a program which asks the user which of the two programs are required. This separate program could be written between lines 1200 and 1350 where there is available line space. It would then be necessary to branch off by inserting a new line before line 5, for instance at line 3, which would read:-

```
3 GOTO 1200
```

Insert your new program beginning with line 1200. When executed this short program would branch back to either line 5 or line 1400 depending on the users requirements. Be brave try merging the two programs and writing a short link program.

```
1400 REM birdfacts
1401 MODE 2
1402 DIM na$(14) : DIM si$(14) : DIM no(14) : DIM
co$(14) : DIM be$(14) : DIM ha$(14) : DIM fo$(14)
: DIM ne$(14) : DIM eg$(14) : DIM mo$(14) : DIM ds
$(14)
1430 PEN 0 : INK 0,0 : PEN 1 : INK 1,26
1490 FOR mn = 0 TO 14
1500 READ na$(mn) : READ si$(mn) : READ no(mn) : R
EAD co$(mn) : READ be$(mn) : READ ha$(mn) : READ f
o$(mn) : READ ne$(mn) : READ eg$(mn) : READ mo$(mn
) : READ ds$(mn)
1510 NEXT mn
1520 CLS : BORDER 6 : PAPER 0 : PEN 1 : LOCATE 3,3
 : PRINT "WHICH BIRD DO YOU WANT INFORMATION ON :"
1525 LOCATE 41,5 : PRINT "1) magpie" : PRINT TAB(4
1);"2) jay" : PRINT TAB(41);"3) swift" : PRINT TAB
(41);"4) house martin" : PRINT TAB(41);"5) swallow
" : PRINT TAB(41);"6) coal tit"
1527 PRINT TAB(41);"7) blue tit" : PRINT TAB(41);"
8) great tit" : PRINT TAB(41);"9) wren"
1535 PRINT TAB(40);"10) robin" : PRINT TAB(40);"11
) blackbird" : PRINT TAB(40);"12) starling" : PRIN
T TAB(40);"13) chaffinch" : PRINT TAB(40);"14) gre
enfinch"
1540 PRINT TAB(40);"15) pied wagtail"
1545 LOCATE 5,21 : PRINT "when you have read the i
nformation hit any key to continue"
```

```
1550 LOCATE 5,23 : PRINT "press the correct number
" : LOCATE 5,24 : INPUT br
1555 IF br >15 THEN PRINT "wrong number, try again
" : FOR t = 1 TO 3000 : NEXT t : GOTO 1520
1560 mp = br - 1
1570 GOSUB 1705
1600 PEN 1 : LOCATE 2,2 : PRINT "NAME: "; : PRINT
na$(mp)
1605 LOCATE 40,2 : PRINT"SIZE: "; : PRINT si$(mp);
" ";no(mp);"cm"
1610 LOCATE 2,4 : PRINT "COLOURING: "; : PRINT co$
(mp)
1615 LOCATE 2,8 : PRINT "BEAK: "; : PRINT be$(mp)
1620 LOCATE 2,11 : PRINT "HABITAT: "; : PRINT ha$(
mp)
1625 LOCATE 2,14 : PRINT "FOOD: "; : PRINT fo$(mp)
1630 LOCATE 2,17 : PRINT "NEST: "; : PRINT ne$(mp)
1635 LOCATE 2,20 : PRINT "EGGS: "; : PRINT eg$(mp)
;" ";mo$(mp)
1645 LOCATE 2,22 : PRINT "DISTINGUISHING MARKS: "
: PRINT ds$(mp)
1680 ab$ = INKEY$ : IF ab$ = "" THEN 1680
1690 GOTO 1520
1705 BORDER 0 : PAPER 0 : CLS
1707 PRINT CHR$(22)+CHR$(1)
1708 PLOT 0,0,1
1710 DRAW 0,395,1 : DRAW 630,395 : DRAW 630,0 : DR
AW 0,0
1715 PLOT 0,365,1 : DRAW 630,365,1 : PLOT 0,300,1
: DRAW 630,300,1 : PLOT 0,250,1 : DRAW 630,250,1 :
 PLOT 0,200,1 : DRAW 630,200,1
1720 PLOT 0,155,1 : DRAW 630,155,1 : PLOT 0,105,1
: DRAW 630,105,1 : PLOT 0,68,1 : DRAW 630,68,1
1725 PLOT 300,395,1 : DRAW 300,365,1
1730 RETURN
2000 DATA MAGPIE,large,45
2005 DATA iridescent black and white plumage
2010 DATA "stout, powerful and slightly curved",wo
oded parks and large open gardens
2015 DATA "insects, seeds, eggs, young birds
2017 DATA domed sructure of twigs in bush or tree
2020 DATA "4-7 lt. green speckled with grey/brown
"
2025 DATA April/May
2030 DATA "long wedge shaped tail, short black and
 white wings"
2040 DATA JAY,medium,33
2045 DATA brown and pink plumage with blue wing co
verts
2050 DATA stout,"woods,hedgerows,parks and gardens
```

```
, seldom far from trees"
2055 DATA "acorns, eggs and young birds, insects,
worms, mice, lizards"
2060 DATA twigs lined with rootlets and hair in bu
sh or tree
2065 DATA "3-6 green-tinged with olive-brown freck
les",April to June
2070 DATA blue wing coverts barred with black and
black and white crown feathers
2080 DATA SWIFT,small,16
2085 DATA black and brown plumage with white chin
patch
2090 DATA small and sharp,having weak legs they ca
nnot walk on land and cling to walls and cliffs
2095 DATA "insects, flies, beetles and moths all t
aken in flight"
2100 DATA "straw, grass and feathers, under eaves
or in crevasses and cemented with saliva"
2105 DATA 2 or 3 white ,May/June
2110 DATA "long, scythe-shaped wings with a forked
 tail"
2120 DATA HOUSE-MARTIN,small,13
2125 DATA blue/black above with white underneath a
nd rump
2130 DATA small and sharp,aerial birds will cling
to walls or sit on pylons or overhead wires
2135 DATA almost entirely insects caught on the wi
ng such as flies and beetles
2140 DATA "rounded nest built of mud, grass and ro
ots, lined with feathers, under eaves"
2145 DATA 4-5 and white,May/June
2150 DATA do not confuse with swift or swallow
2160 DATA SWALLOW,small,18
2165 DATA steel blue upper parts with chestnut for
ehead and breast
2170 DATA small and sharp,aerial birds will cling
to walls or sit on overhead wires
2175 DATA flying insects caught in flight such as
dragonflies and butterflies
2180 DATA "saucer shaped nest of mud and dried gra
sses lined with feathers,ledge or rafter"
2185 DATA 3 to 6 and white speckled with red/brown
,May to August
2190 DATA long streamers on forked tail
2200 DATA COAL TIT,small,10
2205 DATA glossy blue/black head and white flash o
n nape with pale underparts
2210 DATA small and sharp,"town parks, gardens and
 woods
2215 DATA "insects, beetles, flies, grubs, caterpi
```

```
llars and seeds"
2220 DATA "in tree hole, bank or wall, built on a
moss foundation with hair and feathers"
2225 DATA 6 to 10 white with red/brown speckles,Ap
ril to May
2230 DATA white patch on nape
2240 DATA BLUE TIT,small,11
2245 DATA "wings, tail and crown of head blue, che
eks white, back green, underparts yellow"
2250 DATA small and sharp
2255 DATA common garden bird often found hanging u
psidedown
2260 DATA insects and seeds,in tree hole or nestin
g box,8 to 15 white with red/brown spots,April to
May
2265 DATA colour and often found hanging upsidedow
n
2270 DATA GREAT TIT,small,13
2275 DATA "head/neck glossy black, cheeks white, g
reen back, black band on yellow breast"
2280 DATA small and sharp,common garden bird often
 found hanging upsidedown
2285 DATA insects and seeds,in a hole in a tree or
 wall or nesting box
2290 DATA 8 to 12 white and thickly spotted with r
ed-brown,April to May
2295 DATA glossy black head and black chest band
2300 DATA WREN,small,10
2305 DATA "red/brown with barring on the wings, ta
il and flanks, small tail often cocked"
2310 DATA thin and delicate,"moves about amongst d
ried leaves, low plants and bushes"
2315 DATA "small insects, spiders and seeds","dome
d nest of moss, leaves and grass found in a bush,
creeper or wall in a hole"
2320 DATA 4 to 6 white with fine red-brown spots,l
ate April onwards
2325 DATA very small and tail often cocked up
2340 DATA ROBIN,small,13
2345 DATA "olive-brown above with orange red breas
t, throat and forehead, white belly"
2350 DATA thin and delicate,"gardens, hedgerows an
d woods","insects, seeds and worms","in a hole nea
r the ground, in a bank, pot or ledge"
2355 DATA 3 to 6 white with red-brown spots and bl
otches,March to June
2360 DATA "friendly, cheeky and tame"
2370 DATA BLACKBIRD,medium,25
2375 DATA male jet black with a yellow bill
2380 DATA small and slender,hedges and gardens alm
```

```
ost everywhere,"insects, seeds, worms and fruit"
2382 DATA "neat cup of dry grass, lined with mud a
nd dead leaves, low tree or ledge"
2385 DATA 3 to 5 light blue with brown spots,March
 to July
2390 DATA jet black and yellow bill
3400 DATA STARLING,medium,21
3405 DATA "iridescent purple, green and blue pluma
ge"
3410 DATA short and slender,can be seen almost any
where,"insects, worms, spiders, snails, seeds and
berries"
3415 DATA "untidy nest of dried grass and straw in
 tree hole on cliff or hole",5 to 7 pale blue,Apri
l to May
3420 DATA purple green and blue plumage
3430 DATA CHAFFINCH,small,15
3435 DATA "blue-grey head/neck, pink breast and ch
eeks, chestnut back, white on tail/wings"
3440 DATA strong and stout,"hedgerows, fields and
gardens",seeds and grain,"neat cup-nest of moss/li
chen lined with wool/hair/feathers in hedge or bus
h"
3445 DATA 3 to 6 eggs off white with red-brown blo
tches,April to early June,pink breast and cheeks w
ith white on wings/tail/shoulder
3450 DATA GREENFINCH,small,15
3455 DATA "olive-green with heavy pale bill, yello
w wing bars and tail sides"
3460 DATA strong and stout,"hedgerows, fields and
gardens","seeds, fruit and berries"
3465 DATA "untidy cup of grass/moss/roots, in a bu
sh, tree or hedge",4 to 6 white/pale blue with red
/brown spots and streaks,April to August
3470 DATA the colouring
3475 DATA PIED WAGTAIL,small,17
3480 DATA black and white plumage,thin and delicat
e,"parks, gardens and near water"
3485 DATA "flies, beetles and insects","lines a ho
le in a wall, shed or bank with hair, feathers or
wool"
3490 DATA 5 or 6 grey white marked with grey/brown
,April to June
3495 DATA long tail often wagged up and down
```

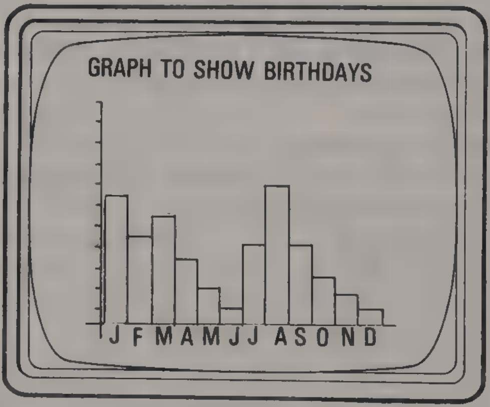
GRAPHS

BIRTHGRAPHS RAINFALL TEMPERATURE

The Amstrad CPC 464 has excellent facilities for collecting and using data, and presenting it in an effective, colourful, graphical and pictorial way. The following three programs will work on the information that you type into the computer. All the programs have full instructions displayed on the screen. Remember, after each item is typed in, the ENTER key must be pressed.

BIRTHGRAPH- a simple program, and though limited, nevertheless emphasises the visual impact of bar charts. Written specifically for a "Birthday Survey" of up to 50 people, the program asks the users to input the month in which they were born. This type of program could be left on in a classroom, so that each child can enter its own birthday month. The information, when collected, is then collated and printed in a list, with the option to present the results as a bar chart.

Your screen will look like this:-



```
1 REM birthgraph
10 h$ = CHR$(143)+CHR$(143)+CHR$(143) : j$ = CHR$(
32)+CHR$(32)
15 ja = 0 : f = 0 : m = 0 : a = 0 : ma = 0 : j = 0
 : ju = 0 : au = 0 : s = 0 :oc = 0 : n = 0 : d = 0

17 WINDOW #1,1,40,1,11
18 WINDOW #2,1,40,12,25
19 WINDOW #3,1,40,1,25
20 PEN 0 : INK 0,0 : PEN 1 : INK 1,6 : PEN 2 : INK
 2,26 : PEN 3 : INK 3,18
30 BORDER 0 : PAPER #3,0 : CLS #3 : PEN #3,2 : LOC
ATE #3,10,2 : PRINT #3,"B I R T H G R A P H"
35 PEN #3,1 : PRINT #3 : PRINT #3,"This program al
lows you to do a birthdaysurvey of up to 50 people
. You will be  asked TO input the month of your
     birthday. The results are then printed  on th
e screen and you can if you wish"
37 PRINT #3,"see the results in a graph."
40 PEN #3,3 : PRINT #3 : PRINT #3 : PRINT #3,"Hit
any key to continue"
45 a$ = INKEY$ : IF a$ = "" THEN 45
50 CLS #3 : PEN #3,1 : PRINT #3,"How many birthday
s do you wish to       record?"
52 PRINT #3,"A maximum of 50."
55 PRINT #3 : INPUT #3,nu
60 IF nu > 50 THEN PRINT #3 : PRINT #3,"Too many."
 : GOSUB 500 : GOTO 50
70 PRINT #3 : PRINT #3,"Hit any key to continue"

75 a$ = INKEY$ : IF a$ = "" THEN 75
80 FOR b = 1 TO nu
82 GOSUB 450
85 CLS #1 : PRINT #1,"Which month is your birthday
 in?"
87 PRINT #1 : PRINT #1,"Write the month in full, w
ith a capital letter at the beginning,then press E
NTER"
90 PRINT #1 : INPUT #1,b$
95 IF b$ = "January" THEN ja = ja + 1 : GOTO 110
96 IF b$ = "February" THEN f = f + 1 : GOTO 110

97 IF b$ = "March" THEN m = m + 1 : GOTO 110
98 IF b$ = "April" THEN a = a + 1 : GOTO 110
99 IF b$ = "May" THEN ma = ma + 1 : GOTO 110
100 IF b$ = "June" THEN j = j + 1 : GOTO 110
101 IF b$ = "July" THEN ju = ju + 1 : GOTO 110

102 IF b$ = "August" THEN au = au + 1 : GOTO 110
```

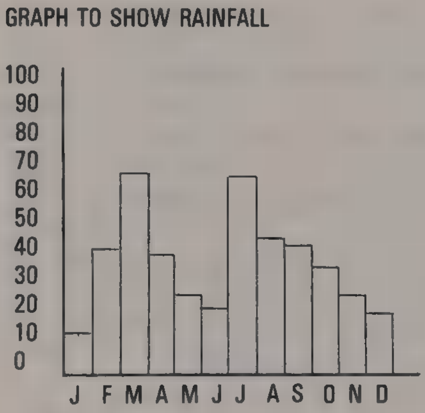
```
103 IF b$ = "September" THEN s = s + 1 : GOTO 110

104 IF b$ = "October" THEN oc = oc + 1 : GOTO 110
105 IF b$ = "November" THEN n = n + 1 : GOTO 110
106 IF b$ = "December" THEN d = d + 1 : GOTO 110
108 PRINT #1,"Wrong spelling or no capital letter!
!" : GOSUB 500 : GOTO 85
110 GOSUB 450 : NEXT b
120 CLS #1 : PEN #1,2 : PRINT #1,"Below is the com
plete table." : PRINT #1 : PRINT #1,"Do you wish t
o see the graph of your    results? (yes or no)"
125 INPUT #1,f$
130 IF LEFT$(f$,1) = "n" THEN PRINT #1,"Cheerio" :
 END
132 IF LEFT$(f$,1) = "N" THEN PRINT #1,"Cheerio" :
 END
135 CLS #3 : PLOT 44,0,2 : DRAW 44,400,2 : PLOT 0,
30,2 : DRAW 620,30,2
138 PEN #3,2 : LOCATE #3,4,25 : PRINT #3,CHR$(32)C
HR$(74);j$;CHR$(70);j$;CHR$(77);j$;CHR$(65);j$;CHR
$(77);j$;CHR$(74);j$;CHR$(74);j$;CHR$(65);j$;CHR$(
83);j$;CHR$(79);j$;CHR$(78);j$;CHR$(68)
140 FOR ww = 48 TO 384 STEP 16 : PLOT 28,ww,2 : DR
AW 43,ww,2 : NEXT ww
142 LOCATE #3,1,1 : PRINT #3,"22" : PRINT #3 : PRI
NT #3,"20" : PRINT #3 : PRINT #3,"18" : PRINT #3 :
 PRINT #3,"16" : PRINT #3 : PRINT #3,"14" : PRINT
#3 : PRINT #3,"12" : PRINT #3 : PRINT #3,"10" : PR
INT #3 : PRINT #3,"8"
143 PRINT #3 : PRINT #3,"6" : PRINT #3 : PRINT #3,
"4" : PRINT #3 : PRINT #3,"2"
145 IF ja = 0 THEN 150
147 FOR e = 1 TO ja : PEN #3,1 : LOCATE #3,4,24-e
: PRINT #3,h$ : NEXT e
150 IF f = 0 THEN 155
152 FOR k = 1 TO f : PEN #3,3 : LOCATE #3,7,24-k :
 PRINT #3,h$ : NEXT k
155 IF m = 0 THEN 160
157 FOR g = 1 TO m : PEN #3,1 : LOCATE #3,10,24-g
: PRINT #3,h$ : NEXT g
160 IF a = 0 THEN 165
162 FOR h = 1 TO a : PEN #3,3 : LOCATE #3,13,24-h
: PRINT #3,h$ : NEXT h
165 IF ma = 0 THEN 170
167 FOR q = 1 TO ma : PEN #3,1 : LOCATE #3,16,24-q
 : PRINT #3,h$ : NEXT q
170 IF j = 0 THEN 175
172 FOR p = 1 TO j : PEN #3,3 : LOCATE #3,19,24-p
: PRINT #3,h$ : NEXT p
175 IF ju = 0 THEN 180
```

```
177 FOR v = 1 TO ju : PEN #3,1 : LOCATE #3,22,24-v
 : PRINT #3,h$ : NEXT v
180 IF au = 0 THEN 185
182 FOR w = 1 TO au : PEN #3,3 : LOCATE #3,25,24-w
 : PRINT #3,h$ : NEXT w
185 IF s = 0 THEN 190
187 FOR x = 1 TO s : PEN #3,1 : LOCATE #3,28,24-x
: PRINT #3,h$ : NEXT x
190 IF oc = 0 THEN 195
192 FOR y = 1 TO oc : PEN #3,3 : LOCATE #3,31,24-y
 : PRINT #3,h$ : NEXT y
195 IF n = 0 THEN 200
197 FOR z = 1 TO n : PEN #3,1 : LOCATE #3,34,24-z
: PRINT #3,h$ : NEXT z
200 IF d = 0 THEN 220
202 FOR r = 1 TO d : PEN #3,3 : LOCATE #3,37,24-r
: PRINT #3,h$ : NEXT r
220 PEN #3,2 : LOCATE #3,12,3 : PRINT #3,"GRAPH TO
 SHOW BIRTHDAYS"
222 a$ = INKEY$ : IF a$ = "" THEN 222
224 END
450 LOCATE #2,1,1 : PRINT #2,"January";ja,"July";j
u : PRINT #2
455 PRINT #2,"February";f,"August";au : PRINT #2
460 PRINT #2,"March";m,"September";s : PRINT #2
465 PRINT #2,"April";a,"October";oc : PRINT #2
470 PRINT #2,"May";ma,"November";n : PRINT #2
475 PRINT #2,"June";j,"December";d
480 RETURN
500 FOR t = 1 TO 3500 : NEXT t : RETURN
```

RAINGRAPH- although still presented in the bar chart form, is more flexible, as alternative scales on the vertical axis are available, depending on the highest monthly reading. RAINGRAPH allows you to store twelve monthly rainfall figures and then have these printed out in a bar chart- a useful asset and additional aid when making comparative geographical studies of different places around the world. A most impressive, simple and colourful bar chart appears, showing the monthly rainfall figures. Having typed out the listing, try these three different sets of readings, which should use all three vertical scales:-

	J	F	M	A	M	J	J	A	S	O	N	D
LAGOS	28	46	102	150	269	400	279	64	140	206	69	25
LONDON	51	38	36	46	46	41	51	56	46	58	64	51
SYDNEY	89	102	127	135	127	117	117	76	74	71	74	74

Your screen will look like this:-



A natural extension of this program would be to add facilities for entering different sets of readings so that, for instance, rainfall comparisons could be made and seen on the chart, for example, monthly readings perhaps, of Lagos, London and Sydney. To be able to do this, would be especially helpful for geography students.

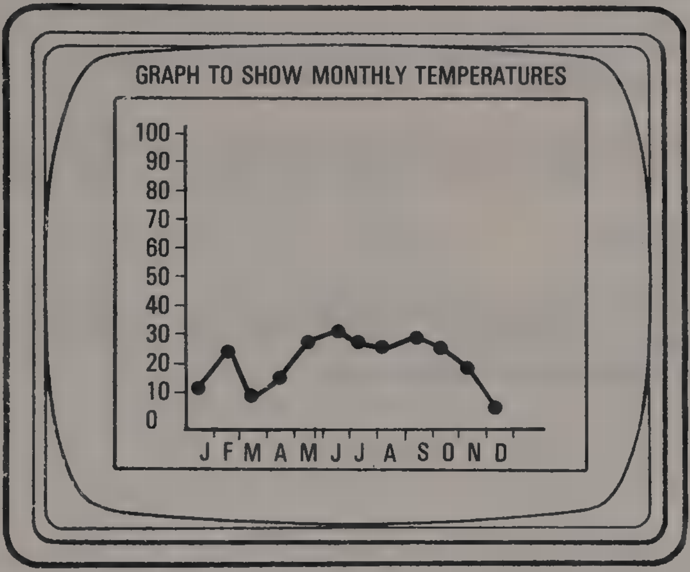
```
1 REM rainfall
10 DIM m(11)
15 PRINT CHR$(22)+CHR$(1)
30 PEN 0 : INK 0,0 : PEN 1 : INK 1,26 : PEN 2 : IN
K 2,7 : PEN 3 : INK 3,15
50 BORDER 5 : PAPER 0 : CLS : PEN 3 : LOCATE 7,6 :
 PRINT "R A I N F A L L  G R A P H" : LOCATE 7,12
: PRINT "ADJN" : LOCATE 29,12 : PRINT "1984"
```

```
55 GOSUB 400
80 PAPER 1 : CLS : BORDER 26 : PEN 3 : PRINT "This
 graph will enable you to store 12  monthly rainfa
ll figures and then show  these on a bar chart."
85 PRINT : PRINT "Give me your highest monthly rea
ding." : INPUT hi
90 PEN 0 : PRINT "Now enter your 12 monthly readin
gs      beginning with January. Only enter the  fi
gure and not the name of the month.   Remember to
press ENTER after each      reading :"
95 b = 7 : PRINT : FOR c = 0 TO 11 : PRINT TAB(b);
 : INPUT m(c) : NEXT c
100 GOSUB 410
110 CLS : PAPER 1 : PEN 3 : PRINT : PRINT "Monthly
 readings are :-"
120 PEN 2 : PRINT : PRINT " January       ";m(0) :
PRINT " February      ";m(1)
130 PRINT " March         ";m(2) : PRINT " April
     ";m(3) : PRINT " May           ";m(4) : PRINT
" June          ";m(5)
140 PRINT " July          ";m(6) : PRINT " August
     ";m(7) : PRINT " September     ";m(8) : PRINT
" October       ";m(9)
150 PRINT " November      ";m(10) : PRINT " Decembe
r      ";m(11)
160 PEN 0 : PRINT " Hit any key to continue."
165 a$ = INKEY$ : IF a$ = "" THEN 165
170 PAPER 0 : BORDER 0 : CLS : GOSUB 350
180 IF hi <= 100 THEN GOSUB 250
182 IF hi > 100 AND hi <= 200 THEN GOSUB 280
184 IF hi > 200 AND hi <= 400 THEN GOSUB 310
190 LOCATE 12,2 : PRINT "GRAPH  TO  SHOW  RAINFALL
"
200 LOCATE 1,1 : END
250 PEN 1 : LOCATE 1,3 : FOR g = 100 TO 0 STEP -10
 : PRINT g : PRINT : NEXT g
255 j = 16/5 : GOSUB 500
260 RETURN
280 LOCATE 1,3 : FOR g = 200 TO 0 STEP -20 : PRINT
 g : PRINT : NEXT g
285 j = 16/10 : GOSUB 500
290 RETURN
310 LOCATE 1,3 : FOR g = 400 TO 0 STEP -40 : PRINT
 g : PRINT : NEXT g
315 j = 16/20 : GOSUB 500
320 RETURN
350 PLOT 61,0,1 : DRAW 61,400,1 : PLOT 0,30 : DRAW
 640,30 : FOR e = 112 TO 640 STEP 48 : PLOT e,15 :
 DRAW e,30 : NEXT e
355 FOR f = 64 TO 352 STEP 32 : PLOT 15,f : DRAW 6
```

```
1,f : NEXT f
360 PEN 1 : LOCATE 6,25 : PRINT "J  F  M  A  M  J
 J  A  S  O  N  D" : RETURN
400 FOR a = 1 TO 10 : SOUND 1,2863,20,7 : SOUND 2,
16,20,7 : BORDER INT(RND*27) : FOR t = 1 TO 200 :
NEXT t : NEXT a : RETURN
410 FOR t = 1 TO 3000 : NEXT t : RETURN
500 FOR h = 64 TO 112 : PLOT h,32,2 : DRAW h,32+IN
T(m(0)*j),2 : NEXT h
505 FOR h = 113 TO 160: PLOT h,32,3 : DRAW h,32+IN
T(m(1)*j),3 : NEXT h
510 FOR h = 161 TO 208 : PLOT h,32,2 : DRAW h,32+I
NT(m(2)*j),2 : NEXT h
515 FOR h = 209 TO 256 : PLOT h,32,3 : DRAW h,32+I
NT(m(3)*j),3 : NEXT h
520 FOR h = 257 TO 304 : PLOT h,32,2 : DRAW h,32+I
NT(m(4)*j),2 : NEXT h
525 FOR h = 305 TO 352 : PLOT h,32,3 : DRAW h,32+I
NT(m(5)*j),3 : NEXT h
530 FOR h = 353 TO 400 : PLOT h,32,2 : DRAW h,32+I
NT(m(6)*j),2 : NEXT h
535 FOR h = 401 TO 448 : PLOT h,32,3 : DRAW h,32+I
NT(m(7)*j),3 : NEXT h
540 FOR h = 449 TO 496 : PLOT h,32,2 : DRAW h,32+I
NT(m(8)*j),2 : NEXT h
545 FOR h = 497 TO 544 : PLOT h,32,3 : DRAW h,32+I
NT(m(9)*j),3 : NEXT h
550 FOR h = 545 TO 592 : PLOT h,32,2 : DRAW h,32+I
NT(m(10)*j),2 : NEXT h
555 FOR h = 593 TO 640 : PLOT h,32,3 : DRAW h,32+I
NT(m(11)*j),3 : NEXT h
560 RETURN
```

TEMPERATURE- a most impressive and extremely useful program allowing you to type in twelve average monthly temperatures, using the Centigrade scale. The program continues by giving the complete list of monthly readings, and then shows them in the form of a line graph.

Your screen may look like this:-



TYPING TIP

When typing in the rainfall and temperature programs make sure that you get the correct spacing in lines 120 to 150 . If you do not, the programs will still work but the screen layout will not be so attractive.

PROGRAMMING HINT - `RENUM`

It would be useful to have all these three programs merged into one but before this could be done each program would have to be renumbered, so that none of the lines overlap.

Follow these instructions:-

1) `load"birthgraph"`

2) type: `renum` and press ENTER

The program has now been renumbered beginning with 10.
It also has line increments of ten and finishes at line 810.

3) Save this program.

4) `load"rainfall"`

5) Type: `renum 1000,1,10`

The program has now been renumbered, beginning at a new line of 1000, starting at the old line of 1 with increments of ten , finishing at line 1500.

6) `save` this program.

7) `load"temp"`

8) Type: `renum 2000,1,10`

The program has now been renumbered beginning at a new line of 2000, starting at the old line of 1, with increments of ten and finishing at line 2350.

9) Save this program.

You have now renumbered all the programs and `SAVE`d them. To get them to merge, follow the instructions under NAME THAT BIRD-PROGRAMMING HINT. Try to write a subroutine to give a choice of programs.

```
1 REM temp
10 DIM m(11)
15 PRINT CHR$(22)+CHR$(1)
30 PEN 0 : INK 0,0 : PEN 1 : INK 1,26 : PEN 2 : IN
K 2,7 : PEN 3 : INK 3,15
50 BORDER 5 : PAPER 0 : CLS : PEN 3 : LOCATE 4,6 :
 PRINT "T E M P E R A T U R E  G R A P H" : LOCATE
 7,12 : PRINT "ADJN" : LOCATE 29,12 : PRINT "1984"

55 GOSUB 400
80 PAPER 1 : CLS : BORDER 26 : PEN 3 : PRINT "This
 graph will enable you to store 12  monthly temper
ature figures and then    show them on a graph. Re
adings must be  on the Centigrade scale."
90 PEN 0 : PRINT "Now enter your 12 monthly readin
gs      beginning with January. Only enter the  fi
gure and not the name of the month.   Each reading
 can be taken to one decimal place. Remember to pr
ess ENTER after   each reading :"
95 b = 7 : PRINT : FOR c = 0 TO 11 : PRINT TAB(b);
 : INPUT m(c) : NEXT c
100 GOSUB 410
110 CLS : PAPER 1 : PEN 3 : PRINT : PRINT "Monthly
 readings are :-"
120 PEN 2 : PRINT : PRINT " January      ";m(0) :
PRINT " February      ";m(1)
130 PRINT " March         ";m(2) : PRINT " April
     ";m(3) : PRINT " May             ";m(4) : PRINT
" June           ";m(5)
140 PRINT " July          ";m(6) : PRINT " August
     ";m(7) : PRINT " September    ";m(8) : PRINT
" October        ";m(9)
```

```
150 PRINT " November      ";m(10) : PRINT " Decembe
r     ";m(11)
160 PEN 0 : PRINT " Hit any key to continue."
165 a$ = INKEY$ : IF a$ = "" THEN 165
170 PAPER 0 : BORDER 0 : CLS : GOSUB 350
180 GOSUB 250
190 LOCATE 6,2 : PRINT "GRAPH TO SHOW MONTHLY TEMP
ERATURES"
200 LOCATE 1,1 : END
250 PEN 1 : LOCATE 1,3 : FOR g = 100 TO 0 STEP -10
 : PRINT g : PRINT : NEXT g
255 j = 16/5 : GOSUB 415 : GOSUB 500
260 RETURN
350 PLOT 61,0,1 : DRAW 61,400,1 : PLOT 0,30 : DRAW
 640,30 : FOR e = 112 TO 640 STEP 48 : PLOT e,15 :
 DRAW e,30 : NEXT e
355 FOR f = 64 TO 352 STEP 32 : PLOT 15,f : DRAW 6
1,f : NEXT f
360 PEN 1 : LOCATE 6,25 : PRINT "J  F  M  A  M  J
 J  A  S  O  N  D" : RETURN
400 FOR a = 1 TO 10 : SOUND 1,2863,20,7 : SOUND 2,
16,20,7 : BORDER INT(RND*27) : FOR t = 1 TO 200 :
NEXT t : NEXT a : RETURN
410 FOR t = 1 TO 3000 : NEXT t : RETURN
415 z = -1 : FOR h = 88 TO 616 STEP 48 : z = z + 1
 : GOSUB 490 : NEXT h : RETURN
490 PLOT h-3,INT(m(z)*j)+35 : DRAW h+3,INT(m(z)*j)
+29
492 PLOT h-3,INT(m(z)*j)+29 : DRAW h+3,INT(m(z)*j)
+35
494 RETURN
500 PLOT 88,INT(m(0)*j)+32,2
502 z = 0 : FOR zz = 136 TO 616 STEP 48 : z = z +
1 : DRAW zz,INT(m(z)*j)+32 : NEXT zz
504 RETURN
```

WORD-FIND

A game for two players.

PARENTS- this is a game designed to improve children's vocabulary, spelling and manipulation of letters. The aim of the game is to find as many different words as possible from the word "VEGETABLE". A time of thirty seconds is allowed for each word to be typed into the computer.

CHILDREN- how many different words can you make from the word "VEGETABLE"? You may only use the letters as many times as they appear in the word and you are not allowed to use proper nouns (the names of people and places). You are not allowed to repeat a word and you are only allowed thirty seconds to type in each answer.

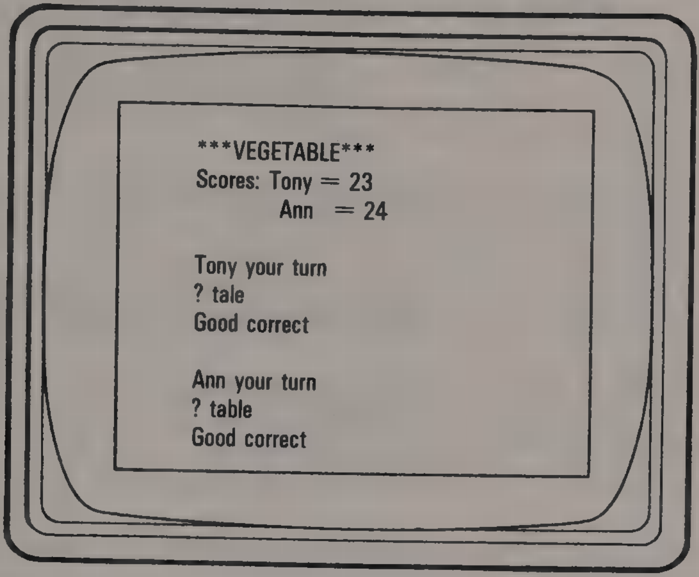
At the beginning of the program you will each be asked your name. You must both type in your names remembering to press the ENTER key after each one. You each start with a score of twenty points and points are awarded to you depending on the length of your word. When you have typed in your word, remember to press ENTER .

For example:-

table ENTER

get ENTER

Your screen should look something like this:-



```
***VEGETABLE***
Scores: Tony = 23
        Ann  = 24

Tony your turn
? tale
Good correct

Ann your turn
? table
Good correct
```

You can stop the game at any time by typing in ‘game over’. Your final scores and the winning name will be shown on the screen.

PROGRAMMING HINTS - TIME

Amstrad Basic has a useful device for identifying the passage of time. In this program, it was necessary to identify a thirty second period of time. Look at lines 240 to 244.

Line 240 switches the clock on and puts the time at zero.
Line 241 is an `INPUT` command, waiting for the player to type a word.
Line 242 checks to see if the player wants the game to finish.
Line 243 works out the time that has elapsed whilst the word has been typed in at line 241.
Line 244 decides whether or not the time that has elapsed is greater or less than 30 seconds (i.e. `IF ticker > 30 THEN` ......) and then the program is executed accordingly.

The crucial commands in using the Amstrad clock are switching on, `datum=INT(TIME/300)` and ascertaining the time lapse with, `ticker%=((TIME/300)-datum)`.

```
10 REM word-find
15 DIM hi$(200)
20 CLS : BORDER 0 : PAPER 0 : PEN 1
30 INK 0,0 : LOCATE 1,4 : PRINT "WORD-FIND"
45 LOCATE 1,7 : PEN 2 : INK 2,20
50 PRINT "This is a game for two players.The aim
of the game is to find words within a   given word
.You are given points for each"
55 LOCATE 1,10
60 PRINT "word.You will not gain any points if you
 try to repeat a word.The word will not count if y
ou take longer than half a"
70 PRINT "minute.After each word you must press
ENTER. If you wish to finish the game   then type
'game over'.
75 LOCATE 1,19 : PEN 1 : INK 1,24
80 PRINT "Hit any key to continue"
90 a$ = INKEY$ : IF a$ = "" THEN 30
100 CLS : BORDER 21 : PAPER 0 : INK 0,20 : PEN 1 :
 INK 1,6
110 LOCATE 4,2 : PRINT "PLAYER 1. What is your nam
e?"
120 LOCATE 4,4 : INPUT nameone$
130 LOCATE 4,8 : PRINT "PLAYER 2. What is your nam
e?"
140 LOCATE 4,10 : INPUT nametwo$
150 LOCATE 4,14 : PRINT "Well done."
160 LOCATE 4,16 : PRINT nameone$;", you will go fi
rst."
170 LOCATE 4,17 : PRINT nametwo$;", you will go se
cond."
175 LOCATE 4,19 : PRINT "You each begin with 20 po
ints."
177 LOCATE 4,22 : PRINT "Let's start"
180 PEN 2 : INK 2,1 : LOCATE 4,24 : PRINT "Hit the
 space bar to continue"
190 a$ = INKEY$ : IF a$ = "" THEN 190
200 totalone = 20 : totaltwo = 20
220 CLS
227 LOCATE 8,2 : PEN 2 : INK 2,8 : PRINT "*** V E
G E T A B L E ***"
230 LOCATE 2,4 : PEN 1 : INK 1,6 : PRINT "SCORES :
 ";nameone$;" = ";totalone
235 LOCATE 11,6 : PRINT nametwo$;" = ";totaltwo
238 LOCATE 1,8 : PRINT nameone$;" your turn"
239 RESTORE
240 datum = INT(TIME/300)
241 LOCATE 1,10 :INPUT word$
242 IF word$ = "game over" OR word$ = "GAME OVER"
THEN 550
```

```
243 ticker% = ((TIME/300)-datum)
244 IF ticker%>30 THEN GOSUB 800 : GOTO 280
246 GOSUB 400: IF m = 1 THEN 280
247 FOR a = 1 TO 69 : READ d$
248 IF d$ = word$ THEN a = 69 : LOCATE 1,12 : PRIN
T "Good correct" : GOSUB 860
250 IF d$ = "finish" THEN LOCATE 1,12 : PRINT "Not
 in my dictionary"
252 NEXT a : FOR k = 1 TO 1500 : NEXT k
280 LOCATE 1,15 : PRINT nametwo$;" your turn"
284 RESTORE
285 datum = INT(TIME/300)
286 LOCATE 1,17 : INPUT word$
287 IF word$ = "game over" OR word$ = "GAME OVER"
THEN 550
288 ticker% = ((TIME/300)-datum)
289 IF ticker%>30 THEN GOSUB 800 : GOTO 220
290 GOSUB 400: IF m = 1 THEN 220
291 FOR b = 1 TO 69 : READ d$
292 IF d$ = word$ THEN b = 69 : LOCATE 1,19 : PRIN
T "Good correct" : GOSUB 900
293 IF d$ = "finish" THEN LOCATE 1,19 : PRINT "Not
 in my dictionary"
294 NEXT b : FOR k = 1 TO 1500 : NEXT k
330 GOTO 220
400 m = 0 : p = p + 1 : h$(p) = word$
410 IF p = 1 THEN 450
420 FOR j = 1 TO p - 1
430 IF h$(j) = word$ THEN m = 1
435 IF m = 1 THEN PRINT "Whoops, used before" : j
= 500 : FOR k = 1 TO 3000 : NEXT k
440 NEXT j
445 IF p = 200 THEN 550
450 RETURN
550 CLS : BORDER 0 : PAPER 0 : INK 0,0 : PEN 1 : I
NK 1,26
560 LOCATE 3,8 : PRINT "GAME OVER. FINAL SCORE"
565 LOCATE 3,12 : PRINT nameone$;" has ";totalone;
" points"
570 LOCATE 3,14 : PRINT nametwo$;" has ";totaltwo;
" points"
575 LOCATE 3,18
580 IF totalone<totaltwo THEN PRINT nametwo$ : GOT
O 950
590 IF totalone>totaltwo THEN PRINT nameone$ : GOT
O 950
592 PRINT "*** D R A W ***" : END
600 DATA beg,table,get,tab,bat,tale,tea,bleat,vet,
bet,veal,let,eel,gave,beet,leg,tag,bale,bag,leave,
able,abet,eat,ate,at,age,alb,ale,alee,alt,bate,bee
```

```
,be,beat
610 DATA beetle,beget,bel,beta,betel,bevel,elate,e
levate,eve,gab,gable,gale,gat,gate,gee,gavel,gel,g
leet,glee,glebe,late,lave,lea,lee,leet,legate,leve
e,teal
620 DATA tee,teg,vale,vat,vegetal,finish,0
800 PRINT "Out of time" : FOR k = 1 TO 3000 : NEXT
 k : RETURN
860 l = LEN(word$) : totalone = totalone + l : RET
URN
900 ll = LEN(word$) : totaltwo = totaltwo + ll : R
ETURN
950 LOCATE 3,20 : PRINT "You won, well done" : END
```

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